

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

ARM LTD., a U.K. corporation,

Plaintiff,

v.

QUALCOMM INC., a Delaware corporation,
QUALCOMM TECHNOLOGIES, INC., a
Delaware corporation, and NUVIA, INC., a
Delaware corporation,

Defendants.

C.A. No. 22-1146-MN

PUBLIC REDACTED VERSION
(Filed July 22, 2024)

**DECLARATION OF NICHOLAS FUNG IN SUPPORT OF ARM LTD.'S
MOTIONS TO EXCLUDE AND STRIKE CERTAIN EXPERT OPINIONS OF MURALI
ANNAVARAM, PATRICK KENNEDY, JOHN COATES, AND JOEL STECKELARM**

VOLUME 4 OF 4 (EXHIBITS 7-21)

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Defendants.

C.A. No. 22-1146-MN

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UNDER SEAL**

**DECLARATION OF NICHOLAS FUNG IN SUPPORT OF ARM LTD.’S
MOTIONS TO EXCLUDE AND STRIKE CERTAIN EXPERT OPINIONS OF MURALI
ANNAVARAM, PATRICK KENNEDY, JOHN COATES, AND JOEL STECKEL**

I, Nicholas Fung, declare as follows:

1. I am an attorney with the law firm of Morrison & Foerster LLP (“Morrison & Foerster”), counsel for Plaintiff Arm Ltd. (“Arm”) in the above-referenced action.
2. I submit this declaration in support of Arm’s Motions to Exclude the Expert Opinions of Murali Annavaram, Patrick Kennedy, John Coates, and Joel Steckel.
3. Attached hereto as **Exhibit 1** is a true and correct copy of the Opening Expert Report of Dr. Robert Colwell, dated December 20, 2023.
4. Attached hereto as **Exhibit 2** is a true and correct copy of the Opening Expert Report of Dr. Mike Chen, dated December 20, 2023.
5. Attached hereto as **Exhibit 3** is a true and correct copy of the Opening Expert Report of Mr. Todd Schoettelkotte, dated December 20, 2023.
6. Attached hereto as **Exhibit 4** is a true and correct copy of the Opening Expert Report of Mr. Guhan Subramanian, dated December 20, 2023.

7. Attached hereto as **Exhibit 5** is a true and correct copy of the Opening Expert Report of Dr. Ravi Dhar, dated December 20, 2023.

8. Attached hereto as **Exhibit 6** is a true and correct copy of the Opening Expert Report of Dr. Murali Annavaram, dated December 20, 2023.

9. Attached hereto as **Exhibit 7** is a true and correct copy of the Rebuttal Expert Report of Dr. Murali Annavaram, dated February 27, 2024.

10. Attached hereto as **Exhibit 8** is a true and correct copy of the Rebuttal Expert Report of Dr. Patrick Kennedy, dated February 27, 2024.

11. Attached hereto as **Exhibit 9** is an excerpt of a true and correct copy of the deposition transcript of John Coates, taken on April 19, 2024.

12. Attached hereto as **Exhibit 10** is a true and correct copy of the Expert Rebuttal Report of Mr. John Coates, dated February 27, 2024.

13. Attached hereto as **Exhibit 11** is a true and correct copy of the Expert Rebuttal Report of Dr. Joel Steckel, dated February 27, 2024.

14. Attached hereto as **Exhibit 12** is a true and correct copy of the Reply Expert Report of Dr. Murali Annavaram, dated March 25, 2024.

15. Attached hereto as **Exhibit 13** is a true and correct copy of the Opening Expert Report of Dr. Patrick Kennedy, dated May 20, 2024.

16. Attached hereto as **Exhibit 14** is an excerpt of a true and correct copy of the deposition transcript of Dr. Murali Annavaram, taken on June 27, 2024.

17. Attached hereto as **Exhibit 15** is an excerpt of a true and correct copy of the deposition transcript of Dr. Robert Colwell, taken on June 28, 2024.

18. Attached hereto as **Exhibit 16** is a true and correct copy of the Reply Expert Report of Mr. Todd Schoettelkotte, dated June 10, 2024.

19. Attached hereto as **Exhibit 17** is a true and correct copy of the Reply Expert Report of Mr. Guhan Subramanian, dated March 25, 2024.

20. Attached hereto as **Exhibit 18** is a true and correct copy of an email exchange

[REDACTED]

[REDACTED] Bates number QCARM_7434227.

21. Attached hereto as **Exhibit 19** is a true and correct copy of an email exchange

[REDACTED]

Bates number QCARM_3535535.

22. Attached hereto as **Exhibit 20** is a true and correct copy of the Expert Reply Report of Dr. Patrick Kennedy, dated June 24, 2024.

23. Attached hereto as **Exhibit 21** is a true and correct copy of an email exchange from July 2021, with the subject line "Follow up," produced by Arm with Bates numbers ARM_01305785 to - ARM_01305789.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Executed this 10th day of July, 2024 at Los Angeles, California.

/s/ Nicholas Fung
Nicholas Fung

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on July 10, 2024, a copy of the foregoing document was served on the counsel listed below in the manner indicated:

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Exhibit 7

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ARM LTD.,

Plaintiff,

v.

QUALCOMM INC., QUALCOMM
TECHNOLOGIES, INC. and NUVIA, INC.,

Defendants

C.A. No. 22-1146 (MN)

REBUTTAL EXPERT REPORT OF DR. MURALI ANNAVARAM

FEBRUARY 27, 2024

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I. INTRODUCTION

1. My name is Murali Annavaram. I have been retained to testify as an expert in this action on behalf of Defendants Qualcomm Inc., Qualcomm Technologies, Inc. (collectively, “Qualcomm”), and Nuvia, Inc. (“Nuvia”) (together, “Defendants”). My qualifications and compensation are set forth in my previously submitted expert report in this matter on December 20, 2023 (“Opening Report”), which is incorporated by reference in its entirety in this report. As with my Opening Report, I am being compensated for my time at my standard consulting rate of \$600, and my compensation is not contingent on any conclusions that I reach or opinions that I may reach.

2. For this report, I have been asked to consider the analysis and opinions provided in the Opening Expert Report of Dr. Robert Colwell (“Colwell Report”) and Opening Expert Report of Dr. Shuo-Wei (Mike) Chen on Qualcomm Source Code (“Chen Report”). I have reviewed Dr. Colwell’s Report and Dr. Chen’s Report and the materials in the attached Appendices and Exhibits.

3. I have reviewed the Colwell Report and the Chen Report in the context of my experience, the materials cited in the reports, Nuvia and Qualcomm’s development work, the incomplete [REDACTED] ([REDACTED])

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹ When I use the phrase [REDACTED] herein, I am referring to the design existing at the time of the Nuvia acquisition.

² When I use the phrase [REDACTED] herein, I am referring to the Qualcomm Core that was worked on post-acquisition at Qualcomm under the Qualcomm ALA.

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[REDACTED]

[REDACTED]

[REDACTED]. When I refer to a Qualcomm Product Design for a particular one of the Qualcomm Cores, I may also sometimes refer to the SoC that incorporates one or more of that particular core. Each of Qualcomm’s Cores and Qualcomm’s Product Designs is represented by a respective Qualcomm Codebase and some of the design elements present in the code may also be described in [REDACTED]. The Qualcomm Codebase is, however, the authoritative source for information for any given Qualcomm Product Design.

4. I expect to be called to provide expert testimony regarding opinions resulting from my analysis of the issues considered in this report, the materials that I have relied upon, and how I reached my opinions. If asked to testify about these issues, I may also discuss my own work, teaching, and publications in the field, knowledge of the state of the art in the relevant time period, and what certain technical terms are understood to mean in the field, including by those involved in the design of microarchitecture. I may rely on handbooks, textbooks, technical literature, my own personal experience in the field, and other relevant materials and/or information to explain relevant technologies, the state of the art in the relevant period, and the evolution of relevant technologies. I may also create demonstratives to further explain some of the discussion that appears in this report.

³ I also discuss the [REDACTED], which refers to the microarchitectural design outside of the CPU designed by Nuvia and Qualcomm. Qualcomm produced [REDACTED].

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And, I may also discuss the source code that Qualcomm has made available for inspection that I have personally reviewed many times.

5. I reserve the right to modify or supplement my opinions, as well as the basis for my opinions, in light of new positions taken by Arm of its experts, the nature and content of the documentation, data, proof, and other evidence or testimony that Plaintiff, ARM LTD. (“Arm”), or its experts may present, or based on any additional discovery or other information provided to me or found by me in this matter.

6. I reserve the right to supplement the opinions in this report based on any subsequent testimony or facts revealed through discovery, as well as any subsequent reports produced by ARM’s experts.

7. To the extent any opinion in the Colwell Report or the Chen Report not mentioned below is directly or indirectly in conflict with any of my opinions expressed in this report, I disagree with Dr. Colwell and/or Dr. Chen, as applicable. Nothing in this report should be understood to be an agreement with any opinions expressed in the Colwell Report or the Chen Report except where I expressly state that I agree with Dr. Colwell or Dr. Chen.

II. SUMMARY OF OPINIONS

8. This section contains a summary of opinions I provide in this report.

9. In my Opening Report, I discussed the Swap Out process that Qualcomm performed to replace Nuvia-sourced ARM Register-Transfer Level (“RTL”) downloaded under the Nuvia TLA with Qualcomm-sourced ARM RTL downloaded under the Qualcomm TLA. In this Rebuttal Report, I address ARM’s claims against Qualcomm and

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Nuvia related to the dispute concerning the Nuvia Architecture License Agreement (“ALA”).

10. Dr. Colwell states that he was “asked to analyze whether certain Qualcomm CPU cores incorporate technology developed by Nuvia under the [Nuvia ALA], [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Colwell Report

¶ 2 (emphasis added). Dr. Colwell has not shown that technology developed by Nuvia, or Qualcomm, [REDACTED] delivered under the Nuvia ALA.

He has also not shown that (1) the [REDACTED] ([REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

11. In answering the question he was asked to analyze, Dr. Colwell appears to

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Colwell Report ¶ 84.

12. That is, Dr. Colwell opines that [REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

13. In offering his opinions, Dr. Colwell focuses on the Arm Architecture Reference Manual (the so called “Arm ARM”), which is a document published by Arm that includes within it an instruction set for the Arm Architecture and referred to as an instruction set architecture (ISA). The Arm ARM does not describe a processing element’s (PE) microarchitecture or how to design one. The Arm ARM’s purpose is to provide information about the Arm Architecture, and “is not intended to describe how to build an implementation of the PE [processing element].”⁴ The Arm ARM describes various aspects of the Arm Architecture but not how to build a specific microprocessor that is compatible with the Arm Architecture. ARM makes this very clear in its own documentation as it explains the difference between architecture and microarchitecture, stating that “Architecture does not tell you how a processor is built or how it works. The build and design of a processor is referred to as micro-architecture. Micro-architecture tells you how a particular processor works.”⁵

14. Furthermore, Dr. Colwell appears to conclude that the entirety of the Arm ARM is included in “[REDACTED],” as that term is defined in the Nuvia ALA. I have been informed that Qualcomm and Arm disagree as to the meaning of “[REDACTED],”

⁴ Arm Ltd., Arm Architecture Reference Manual for A-Profile Architecture A1-38, (J.a 2023), <https://documentation-service.arm.com/static/644a406baa78c007af74e6fd?token=> (last visited February 21, 2024) (also produced at ARM_00011869).

⁵ Arm Ltd., Learn the Architecture – Introducing the Arm Architecture 12, (2.1 2023) <https://documentation-service.arm.com/static/64dcd2a934840622b3496c9?token=> (last visited February 4, 2024).

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including the scope of the deliverables listed in the Nuvia ALA Annex 1⁶ and which portions of the deliverables listed in the Nuvia ALA Annex 1 are captured by the definition of “**[REDACTED]**ology.” I have been informed that Arm’s use of “**[REDACTED]**” is broader than Qualcomm’s.

15.

16.

⁶ I understand that Nuvia entered into two Annex 1's in connection with the Nuvia ALA (September 27, 2019 and March 27, 2020). When I refer to Annex 1 herein, I am referring to the March 27, 2020 Annex. However, my opinions apply across both annexes.

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[REDACTED]

[REDACTED]

17. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

18. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]). Dr. Colwell further opines that because the [REDACTED] corresponds to the [REDACTED] related Qualcomm Codebase, “the Snapdragon® X Elite platform of SoCs and Qualcomm [REDACTED] CPU [REDACTED] [REDACTED] *Id.* ¶ 115. I disagree with each of these opinions. [REDACTED]

[REDACTED] Further, Qualcomm undertook substantial design and development of the [REDACTED] post-acquisition, and Qualcomm commenced the design and development work of the remainder of Qualcomm’s Cores following the Nuvia acquisition, as I describe in Section VI. Still further, as I describe in Section VII, Dr. Colwell’s opinion is not supported by Dr. Chen’s analysis of the Qualcomm Codebases. Dr. Chen did not provide any analysis of the SOC codebase and, instead, limited his analysis to only a subset of files in what he calls the “[REDACTED].” In particular, in Section VII, I describe how Dr. Chen’s source code analysis does not accurately calculate the similarities and does not demonstrate that any of the asserted similarities is derived from the [REDACTED]

19. In this Rebuttal Report, I am responding to Dr. Colwell’s analysis in the Colwell Report and Dr. Chen’s analysis in the Chen Report. I am not a lawyer. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

III. BASIS FOR OPINIONS

20. My opinions are based on my knowledge and experience in the technical areas at issue in this report and the materials that I have considered. My qualifications are summarized in Section II of my Opening Report.

21. As part of my preparation for writing this report, I reviewed the materials listed in Appendix A to this report. These materials include, but are not limited to, the following: (1) Qualcomm’s and Nuvia’s development documents, microarchitecture specifications, and source code; (2) ARM’s documentation including the ARM Reference Manuals, architecture documents and extensions; (3) license agreements and correspondence between the parties and copies of the documents described in this report; and (4) discovery responses and deposition transcripts.⁷

IV. TECHNOLOGY BACKGROUND

A. Processor Technology

22. A System-on-Chip or SoC design places a variety of components such as processors, caches, memories, and input/output devices all on a single piece of silicon. Such a design offers both reduced latency for executing an application and reduced power consumption than a design in which the various components are placed on separate chips. One reason for improved SoC power efficiency and performance is that the components on the SoC can communicate with each other using on-chip wires that have lower resistance than off-chip pins. SoCs also enable integration of heterogenous technologies

⁷ I also incorporate by reference the Nuvia Agreements and Annexes and reserve the right to reference them and use sections as demonstratives.

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such as central processing unit (CPU), graphics processing unit (GPU), volatile memory such as DRAM that holds application programs when they are executing, and non-volatile storage such as Flash memory that holds applications and other media files even when the device is turned off.

23. One of the components typically included on an SoC is one or more Central Processing Unit (CPU) cores. Each CPU core may include additional components or blocks such as a data cache, an instruction cache, an Arithmetic Logic Unit (ALU), a Memory Management Unit (MMU), and a Floating Point Unit (FPU). A CPU may include only a single CPU core (called a single-core CPU or single-core processor) or may include multiple CPU cores (called a chip multiprocessor (CMP) or multi-core processor). The primary function of a CPU is to fetch, decode, and execute instructions to control and communicate with other components.

24. A CPU is designed to process and execute instructions. The set of instructions that the CPU can execute are part of the instruction set architecture or ISA. The ISA can include simple instructions like “ADD” to add two numbers together, but may also include more complex instructions. While each instruction may perform only a simple operation, multiple instructions can be combined together in a program to perform complex operations that enable the development of the software commonly found on personal computers and mobile devices.

25. Each instruction supported by the CPU is defined in the ISA in terms of what that instruction does (e.g., a logic operation, a data transfer operation, or a jump operation), in terms of where that instruction obtains its operands and stores its results (e.g., a memory address or a register), and in terms of the format of the instruction (e.g., its length

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and the meaning of its fields). Everything included in the ISA is visible to a programmer who is using those instructions to write a program to be executed by any CPU designed to support that ISA.

26. Although the ISA specifies the instructions that are supported by a CPU, the ISA does not specify the design of that CPU. There are many different ways to implement an ISA, and none of those different ways is defined by or required by the ISA. The instructions include opcodes represented by binary that lacks creativity. For example, Intel processors and AMD processors are two different implementations of the commonly-recognized x86 ISA. A particular implementation of an ISA is referred to as a microarchitecture, and different microarchitectures can vary in such things as power consumption and performance based on the goals and details of its design.

27. The value of the ISA arises from the value that software and hardware programmers invest into creating their own, unique programs and CPUs that operate using the ISA interface. If the designer of the CPU complies with the ISA, then a program written with those instructions can be executed by the CPU. As additional software and hardware is developed using the ISA, the benefits of the ISA continue to grow as a more established and expansive ecosystem is created.

B. RTL

28. RTL describes the implementation of the CPU’s microarchitecture. RTL design is a digital design methodology that focuses on the transfer of data between registers within a digital system. It serves as an abstraction level between the high-level behavioral description of a system and its physical implementation in hardware. At the Register-

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Transfer Level, designers describe the behavior of the system in terms of registers, data flow, and control signals.

29. The RTL can be created manually using a Hardware Description Language (HDL) such as Verilog or it can be created automatically from a higher-level language using an RTL synthesis tool. After the RTL representation is completed, many additional steps are needed, such as wiring place and route, and verification. Once all these steps are completed the RTL specific design can be used to create an actual physical device.

30. RTL may be organized into groups of code referred to as “modules,” with each module likewise organized into smaller groups of code referred to as “submodules.” Organizing the RTL into modules and submodules improves the efficiency in managing large projects by allowing code to be modularized and re-used in different aspects of the projects. For example, the RTL modules for complex functions implemented in a CPU can be treated as abstract boxes with input and output pins. Hence different module developers can easily interface without knowing the details of the module design.

31. Verilog has many things in common with regular programming languages like C or Fortran. For example, a module is, conceptually, very similar to a subroutine. However, the behavior of a Verilog program is generally dictated by the way signals are routed across connected modules rather than by the order of code that appears within the Verilog program.

32. For a simple example of RTL language, consider a D (Delay) flip flop that transfers an input value to an output on the falling edge of a clock signal. This is a common component in digital logic circuits, like CPUs. The flip flop can be used to temporarily

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store data during CPU operation. The behavior of such a component could be described with RTL as follows:

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

33. The “always” statement in that RTL description indicates that when the clock goes from high to low (i.e., on a falling or negative edge) the output register “q” is assigned the input value “data” after a delay of one time unit.

34. The use of RTL in the design of a CPU provides numerous advantages including ease of development of the processor using a high-level programming abstraction, much like writing software using C/C++ to accomplish an application task. The hardware designers do not need to worry about how the digital gates, such as AND and NOR gates, are implemented in a particular process technology node.

35. A second advantage provided by RTL is structured design validation in which the designers are able to simulate and test individual modules separately and then test the interfaces between modules and submodule to achieve a hierarchical testing approach. These tests must go beyond simply testing the functionality of an instruction and instead test the various detailed microarchitectural interactions. Such structured testing allows the designers to identify and correct problems in the microarchitecture much earlier in the design process and with much less cost than would be incurred later in the process.

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36. A third advantage provided by RTL is modularity. Designers can create libraries of RTL components that can be easily reused across an entire design. For example, the flip flop described in the example RTL code above may be a defined module that is re-used throughout several blocks of an SoC. These reusable blocks can be easily integrated into new designs, promoting design reuse, reducing development time, and enabling faster prototyping and system assembly.

C. Overview of Computer Systems

37. Computer systems are segmented into various levels of abstraction.

38. The top layer is the application software. It is the layer that users are most familiar with (e.g., a word processor, calculator, video player, or any other program). Programmers typically write application software in high-level programming languages like C++ and Java.

39. The Operating System (“OS”) interfaces between an application and the hardware, and it performs operations such as allocating storage and memory, handling basic input and output operations, and enabling multiple applications to use the same microprocessor simultaneously. Examples of OSs include Windows, Mac, and Android.

40. The next layer of the stack is the ISA. ISA refers to the instruction set, which includes the list of instructions that a compatible processor may execute, operands formats, and a memory model. Operands are objects upon which an instruction operates. For example, in the instruction “a = b – c”, a, b, and c are considered operands and subtraction (-) is considered the operation. [REDACTED]

[REDACTED].⁸

⁸ Arm Architecture Reference Manual for A-Profile Architecture, Issue J.a., *supra* note 4; Dave Jaggard, Arm Architecture Reference Manual (2d ed. 2001); RISC Machs. Ltd. (ARM), Arm Architecture Reference Manual,

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41. The next layer of the stack is microarchitecture. Microarchitecture is the design of a computer's processor in which an engineer specifies how the processor executes instructions received from the application . For the same ISA there may be many different microarchitecture designs with different characteristics. Different microarchitecture designs may be made with different choices regarding trade-offs of performance, power, cost, and complexity, allowing designers to design microprocessors optimized for particular types of markets. A microprocessor built for a server data processing system may be vastly different from a microprocessor built for mobile systems, even for the same ISA. The microarchitecture can be used to synthesize logic circuitry according to the designed microarchitecture.

42. A designer designs a microarchitecture in a language such as Register Transfer Language (“RTL”), which I described in my Opening Report. Once written in RTL, a series of hardware synthesis and design tools may synthesize the RTL into the actual circuits and gates that are ultimately fabricated onto a chip.

D. Instruction Set Architecture

43. In this section, I introduce the concept of instructions and ISAs, including opcodes and field registers.

1. The role of an instruction is to specify the hardware functionality an application can use

44. An ISA includes a set of instructions that specify how applications interface with a microarchitecture to execute operations. The instructions are represented in binary format. Each instruction represents an operation, such as an ADD or MULTIPLY

(B 1996); Gerry Kane and Joe Heinrich, MIPS Risc Architecture (2d ed. 1991); Andrew Waterman, et al., The RISC-V Instruction Set Manual Vol II (2021).

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operation, as a series of binary bits. The instruction may include a set of source operands and a destination operand to specify the data for the operation. This binary representation of instructions is known as *machine language*.

45. Operands may come from memory, registers, or the instruction itself. For example, an instruction such as an ADD instruction may contain information on the location in memory of the two numbers to add. A programmer could write this instruction in a lower-level programming language, such an *assembly language*, as “ADD A,B”, where A and B are the operands, and an assembler would convert it into machine language (the binary code of an ADD operation). In general though, software programmers use higher-level programming languages such as C, C++ or Java that can be put by a compiler into assembly language and subsequently to machine language. For example, a C program is compiled into assembly language and then assembled into binary machine language.

2. An ISA forms an abstract interface between the hardware and software of a computing device

46. The ISA allows a software programmer to focus on operations separately from the microarchitecture that delivers the actual results within a given power, performance or cost constraints.

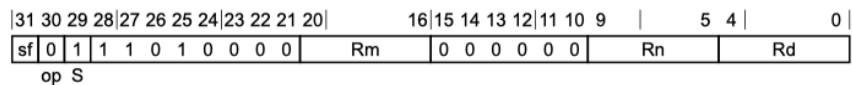
47. Each instruction in an ISA has an associated operation code, referred to as an “opcode”, which is the binary string that uniquely identifies instructions. A microprocessor “decodes”, in other words recognizes, the representations of the instructions to get the opcode. The microarchitecture decodes the opcode to determine the operation represented in the opcode and generate control signals that carry out the operation according to how the designer designed the microarchitecture.

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48. Any microprocessor design compatible with the Arm ISA must recognize the instructions (or “vocabulary”) of the architecture in order for the same application to produce the same results across different microprocessors designed with different microarchitectures. An example definition of an instruction specified as a certain sequence of 1’s and 0’s is shown below⁹:

ADCS

Add with Carry, setting flags, adds two register values and the Carry flag value, and writes the result to the destination register. It updates the condition flags based on the result.



49. In order for an application to be executed by different microarchitectures supporting the same ISA, the microprocessor must recognize this sequence of instruction bits as an opcode indicating an addition with carry operation that must be performed with the source operands specified in the Rm, Rn fields and putting the result in register Rd.

50. In the microarchitecture for a microprocessor, the opcode is decoded into control signals. The number of and type of control signals is designed by the microarchitect to correspond to the portions of the microarchitecture that carry out the operation performed by the instruction. The decoding thus designed is unique to each microprocessor’s microarchitecture. The opcode itself, reflected in the ISA, is decoded but the output of the decoder is a specific sequence of 1’s and 0’s that activate the various microarchitectural structures that are specific to a particular processor design.

51. A designer is free to design the microarchitecture in any number of ways to perform the operation indicated by the opcode. A microarchitecture design can fail to

⁹ ARM v8 C6.6.2.

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achieve success in the market, regardless of any characteristics and benefits thereof of the architecture. For example, a designer may make poor choices in the trade-offs involved in the microarchitecture and as a result not be successful in the target market despite being compatible with a certain ISA. Thus, the success of a company’s microprocessor has to do with the designer and whether the microarchitecture design provides better performance/power/features over competitors.

52. Dr. Colwell discusses companies such as Apple and Alphabet as multi-trillion dollar industries. Colwell Report ¶ 20. The success of these companies is a complex function of many market demands and product innovations, most of which are not all related to microprocessors.

53. Similarly, Dr. Colwell suggests that the success of the Internet, smartphones, and the like is based on computers and processors becoming fast enough and inexpensive enough. *Id.* ¶ 21. However, the success of computer technologies is a result of efforts from engineering teams working across a wide range of challenges, including challenges separate from microprocessor development and work performed before the existence of ARM. For example, the development of wireless communications was a major factor to the success of the Internet and mobile devices.

54. Many ISAs, such as Intel’s x86 ISA, IBM’s Power ISA, the MIPS ISA, or the RISC-V ISA, provide similar instructions as one another. For example, the opcode ADD in the ARM ISA specifies that values stored in two registers must be added together. The same instruction exists in the RISC-V ISA and the Intel x86 ISA.

55. Dr. Colwell claims that ARM “explicitly aimed to enable compatible implementations that emphasized good performance at outstanding power efficiency.” *Id.*

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¶ 27. Although many ARM-compatible microprocessors do target power efficiency, rather than any substance or teaching in the ISA, the power efficiency is obtained through significant engineering effort in the design and fabrication of the microarchitecture of the microprocessor, a process which I describe in other sections of this Report. Indeed, Dr. Colwell describes the same when he notes that a microarchitecture can “optimize[] performance above all else, including at the expense of high power and high product cost” or can be “optimized for low power and long battery lift, as required by mobile platforms such as tablets, smartphones, and laptops.” *Id.* ¶ 39.

E. Microarchitecture

56. While the ISA specifies instructions that an application programmer can use to interface with the microprocessor, the microarchitecture defines how the operations are carried out and the microarchitecture is designed to fit a particular constraint such as power/area, and the market requirements. The microarchitecture of a processor is designed in accordance with the needs of a market segment a processor is targeted for. There are also constraints on cost, power, performance, thermals, area, and complexity a designer has to grapple with in designing a microarchitecture.

57. For example, one of the microarchitecture design choices is to decide on the pipeline stages implemented in a core. A pipelined execution splits the work associated with an instruction into multiple smaller work chunks. And each smaller chunk of work is done using a single pipeline stage and each pipeline stage is generally completed in a single clock cycle. Processor microarchitects may choose deeper pipelines for high frequency execution or shallower pipelines for reducing design complexity.

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58. Microarchitects may also choose to implement in-order pipelined execution or out-of-order pipelined execution. In out-of-order processors the execution of instructions can proceed in an order that is different than the compiler generated code order. Out-of-order (OOO) execution allows a newly arriving instruction to start its execution even if there are some older instructions waiting in the pipeline for their source operands. This choice of OOO or in-order execution is a design decision made by the microarchitect.

59. OOO execution allows faster execution of a program by allowing instructions to execute as soon as their source operands are available, without waiting for the precise order of the code generated by the compiler. But, the designer has to handle significant challenges posed by OOO execution none of which is defined in any ISA document, such as the Arm ARM.

60. One such challenge is conditional execution. Applications routinely insert conditional execution statements. For example, a programmer may want to add two numbers *if* the two numbers are positive. Thus a condition must be verified before the addition operation can be performed. Waiting for the verification of the condition slows down the program. Hence the microarchitect may choose to *speculatively* execute the addition operation. But such speculative execution has to be guided by some confidence that the values used in the addition are positive. Such a confidence mechanism must be designed by the microarchitect.

61. Branch predictor hardware is built for this purpose to enable a more informed guess on whether the condition is going to be true or not. If the guess is wrong, then the microarchitect has to design additional microarchitecture structures to remove the effects of wrongly executing the instruction, a process called branch misprediction

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handling. Both branch predictors and misprediction handling structure are microarchitectural choices that are made by the designer.

62. Another challenge in OOO execution is the memory hierarchy. When executing instructions, the source operand data must be brought as close to the execution units as possible. While all the source operands are available in large memory chips accessing data from such large memory chips is slow compared to the speed of the instruction execution. Hence, waiting for data to be fetched from memory is not a viable option.

63. To tackle the memory latency challenge, microarchitects design small amounts of fast memory, called caches, closer to the processor. These cache memories allow for temporary storage of a small sample of application data. It is the microarchitect’s responsibility to determine what sample of data is to be brought in, and for how long it should stay in the cache before it is replaced by another data sample. These policies and procedures are complex, and a microarchitect designs these caches.

64. In fact, microarchitects design hardware structures called prefetchers that speculatively bring data from distance memory into nearby caches. These prefetch hardware structures must track past behaviors of the program, in specialized hardware structures, and determine what sample of data must be prefetched into the cache. That way, at a future time, if this data is requested by the application that data is quickly accessed from the cache, rather than going to the slow memory. It is also possible that the data that is prefetched may be wasted if it is not later used by the application. Hence, the microarchitect has to carefully consider the cost of speculatively bringing data, for example

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the cost of wasted power. Microarchitecture for prefetching is not described in an ISA document, such as the Arm ARM.

65. An application has many instructions with dependencies. One instruction may generate data used by another instruction. For example, a store operation may store data to cache that may be later loaded by a load operation. Thus, OOO execution has to consider the dependency order and must strictly respect the data dependency requirements. Yet again, the microarchitect must deal with this issue of when to reorder instructions without causing program inaccuracies. The microarchitecture may design new types of dependency predictors, such as load/store dependency predictors, to handle such a situation. Microarchitecture for predictors is not described in ISA documents such as the Arm ARM.

66. Some market segments such as datacenter servers exhibit workloads that cause designers to choose to implement large number of homogeneous cores on a chip. Large homogeneous multicore processors have been correctly described as an “enabling technology for large application domains with abundant threads, such as computer graphics, scientific/engineering computing, database management, and telecommunication services.”¹⁰

67. For a mobile market segment, the microarchitect may choose to implement heterogenous multi-core processors where each core may be optimized for a different type of application. For instance, a web browsing application on a mobile phone may require a relatively moderate performance core, while a gaming experience may require high performance core. Thus, the microarchitect has to design the type and level of

¹⁰ Dubois, et al., *Parallel Computer Organization and Design* xi, (Cambridge Univ. Press 2012).

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heterogeneity to incorporate into a processor design, and microarchitecture heterogeneity is not described in an ISA document, such as the Arm ARM.

68. To summarize, whereas an ISA document such as the Arm ARM specifies instructions to execute and the structure of the operands, the ISA does not provide the microarchitecture, let alone the step-by-step methods utilized by the control and datapath, all of which designers accomplish through innovation and creativity when designing the microarchitecture. An ISA document, such as the Arm ARM, does not specify or provide microarchitecture for different power, performance, and other requirements of the intended use case.

69. When a binary bit pattern of an instruction is received by the processor, the instruction may be stored into caches for efficiently accessing instructions without having to repeatedly access main memory. The caching policies and cache management is a microarchitecture detail of the core that is not guided by the Arm ARM. Once the instructions are cached, the instructions are then accessed and decoded. The decoder is a hardware component, developed by the microarchitect, that is designed to read the instruction and decode the representation in the instruction to identify the operation requested by the application. The decoder’s output is a set of control signals, potentially hundreds or thousands, that are designed to match the microarchitecture of a particular core and differ from design to design. For example, the decoder may generate the appropriate read and write port enable signals to read and write the data from the registers. The number of ports and their access latencies are all part of the microarchitecture, and not described in the Arm ARM. The outputs generated from the decoder are thus driven by the microarchitecture of the core.

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F. From Microarchitecture to Silicon

70. The microarchitecture that I described above is usually written in a hardware description language, such as Verilog or VHDL (e.g., the RTL code I described in my Opening Report). These hardware descriptions have to be eventually synthesized into circuits and gates that can be implemented in silicon (e.g., as a physical chip). There are tools that automate this process to some extent. The designers still have to fine tune the outcomes provided by these tools to get the best results. The final gate level design produced by these tools results in a file called Netlist file which will be readied for fabrication, where the physical silicon chip is produced with the designed microprocessor.

71. After fabrication, the microarchitecture is represented in the physical structures on a physical chip that includes transistors, wires, and other components built on a substrate, typically silicon. For this reason, the term “silicon” is used in the CPU industry to refer to physical chips produced by a microarchitect, whether Nuvia or Qualcomm. Dr. Colwell did not discuss any physical chips, and thus I have not analyzed any physical silicon as part of the preparation of my Rebuttal Report. I have been informed that, as described by Christin Cong Tran, physical silicon is not considered to be ARM Confidential Information or a derivative of ARM Technology and that Arm does not believe that physical silicon chips created by Qualcomm are covered by the Section 15.1 termination obligations. Tran Dep. Tr. at 164:5-166:8.

V. BACKGROUND FACTS AND TIMELINE

72. In this section, I will discuss background facts relevant to this report including the parties, nature of the dispute, and Nuvia’s Architecture License Agreement (“ALA”) with ARM. I will further provide a timeline outlining facts relevant to this report.

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A. The Parties

1. Qualcomm

73. Founded in 1985, Qualcomm is a technology company that develops and manufactures integrated circuit products (i.e., chips) and licenses its technology. Qualcomm has been a “global leader in the development and commercialization of foundational technologies for the wireless industry, including 3G (third generation), 4G (fourth generation) and 5G (fifth generation) wireless connectivity, and high-performance and low-power computing including on-device artificial intelligence (AI).”¹¹

74. Today, Qualcomm’s chips are found in mobile phones, laptops, virtual and augmented reality products, autonomous driving and digital cockpit solutions, wearables, and smart home products, among others.¹²

75. Qualcomm’s Snapdragon products are highly integrated, system-based solutions that include the Snapdragon mobile, compute, sound and automotive platforms. Each platform consists of microprocessors and wireless connectivity capabilities, including Qualcomm’s cellular modem that provides core baseband modem functionality for voice and data communications, non-cellular wireless connectivity (such as Wi-Fi and Bluetooth) and global positioning functions. Qualcomm’s Snapdragon microprocessor operations include artificial intelligence (“AI”) / neural processing unit (“NPU”), CPU, security, graphics, display, audio, video and camera. Qualcomm’s CPUs are designed to deliver high levels of compute performance with optimized power consumption. Qualcomm Hexagon NPUs are designed to support a variety of AI processing tasks for superior performance-per-watt. Qualcomm Adreno graphics processing units are designed

¹¹ Qualcomm Inc., Annual Report (Form 10-K) at 6 (Nov. 1, 2023).

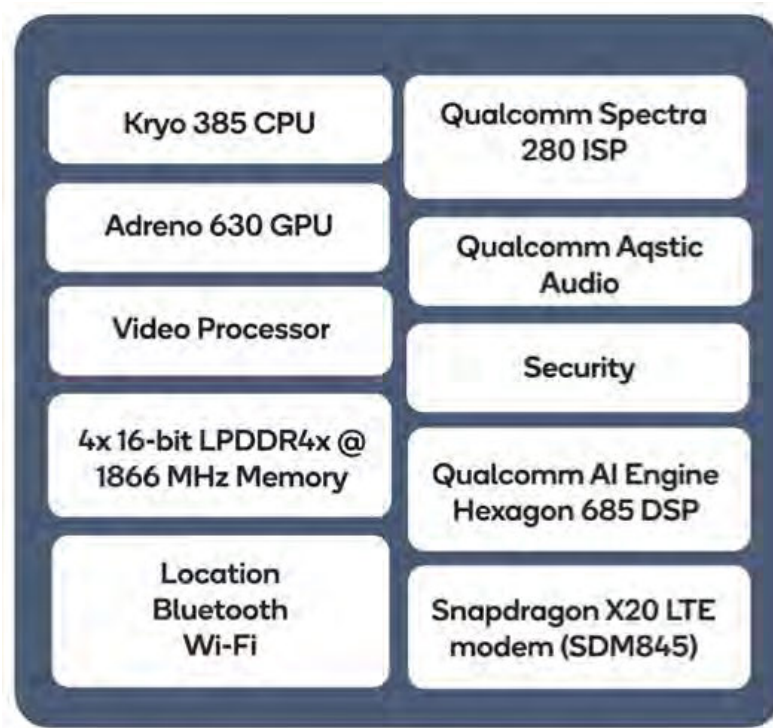
¹² Products, Qualcomm, <https://www.qualcomm.com/products> (last visited Feb. 26, 2024).

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to deliver high quality graphics performance for visually rich 3D gaming and user interfaces. And, Qualcomm also designs and supplies supporting components, including the RF transceiver, PM (power management), audio, codecs, speaker amps and additional wireless connectivity integrated circuits.

76. The figure below is a simplified block diagram of a Snapdragon SoC. The microprocessor is the portion of the SoC that may include CPUs (labeled as Kryo 385 CPU)¹³ but the SoC also includes many other components (illustrated as GPU for driving visual displays and games on the device, ISP for processing camera data to take pictures, etc.). The CPU(s) in an SoC are only a small portion of the functionality provided by the SoC, and each of the components may provide a feature or benefit of desire to a user. For example, photography on a computing device is an important consideration to a user, and that photography is supported by the ISP. As another example, wireless communications on a computing device is an important consideration to a user, and that wireless communications is supported by the modem. Each of these blocks involve significant engineering effort on their own, in addition to significant engineering effort in combining the blocks into a single SoC.

¹³ The illustration inserted below references a Kryo 385 CPU. This illustration is of a prior Qualcomm SoC that is part of the Qualcomm Snapdragon 845 Mobile Platform. The Kryo 385 CPU included in that platform is a CPU that includes a microarchitecture from the ARM Cortex family. The Qualcomm Product Designs I describe throughout this Rebuttal Report are compatible with the Arm ISA but different in design than the Kryo 385 CPU and the ARM Cortex.

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2. Nuvia

77. NUVIA Inc was founded by Gerard Williams III, Manu Gulati, and John Bruno in early 2019 to design a data center processor chip that is faster and more power-efficient than current offerings.¹⁵ Nuvia targeted customers that run massive data centers and primarily use chips from Intel Corp and Advanced Micro Devices Inc.

78. Prior to co-founding Nuvia,¹⁶ Gerard Williams III was a Senior Director at Apple and Chief CPU Architect for nearly a decade with responsibilities for a range of leading-edge CPUs and SoCs across a broad array of devices. Before joining Apple, Mr. Williams spent over 10 years at ARM, as an ARM Fellow, and serving on the ARM

¹⁴ Qualcomm, Qualcomm SDM845 / Qualcomm SDA845 SOC's at 2 (2020), https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/sdm-sda845-product_brief_87-pu778-1.pdf.

¹⁵ Steven Nellis, *Nuvia, Founded by Ex-Apple Execs, Raises \$240 mln for Data Center Chips*, Reuters, Sept. 24, 2020, <https://www.reuters.com/article/idUSL2N2GL032>.

¹⁶ Gerard Williams III, LinkedIn, <https://www.linkedin.com/in/gerard-williams-iii-27895aa> (Feb. 27, 2024).

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Architectural Review and Technical Advisory Boards. While at ARM, he served as a technical advisor for the ARM architecture and CPU development to many key ARM partners. Mr. Williams began his career with tenures at Intel and Texas Instruments.

79. Prior to co-founding Nuvia,¹⁷ Mr. Gulati was the lead SoC Architect for consumer hardware at Google, playing a key role in defining the company’s silicon and product roadmaps. Before joining Google, Mr. Gulati spent eight years at Apple as the lead SoC architect responsible for numerous Apple leading-edge mobile SoCs across a range of devices. Before joining Apple, Mr. Gulati spent nearly a decade at Broadcom holding a range of senior SoC engineering roles. Mr. Gulati started his career at AMD and 8x8 and has over 58 issued patents to date.

80. Prior to co-founding Nuvia,¹⁸ Mr. Bruno was a System Architect at Google, driving such areas as SoC definition and competitive performance and power analysis. Before joining Google, Mr. Bruno spent five years at Apple in a similar role in the company’s platform architecture group where he founded Apple’s silicon competitive analysis team. Mr. Bruno started his career in 1996 as an ASIC designer at ATI Technologies Inc. where he climbed the ranks to become the ASIC team leader responsible for multiple mobile GPUs and integrated chipsets. After AMD’s acquisition of ATI, Mr. Bruno became the Chief Engineer for the Trinity Fusion APU.

81. Nuvia sought to tap its founders’ experience building powerful chips for battery-powered devices.¹⁹ Qualcomm publicly announced that it would be acquiring

¹⁷ Manu Gulati, LinkedIn, <https://www.linkedin.com/in/manu-gulati-283346> (last visited Feb. 27, 2024).

¹⁸ John Bruno, LinkedIn, <https://www.linkedin.com/in/john-bruno-p-eng-88616a1> (last visited Feb. 27, 2024).

¹⁹ Steven Nellis, *Former Apple Chip Executives Found Company to Take on Intel, AMD*, Reuters, Nov. 15, 2019, <https://www.reuters.com/article/us-nuvia-tech/idUSKBN1XP19V/?il=0>

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Nuvia on January 12, 2021,²⁰ and Qualcomm publicly announced that it completed the acquisition on March 15, 2021. [REDACTED] (as existing at the time of the Nuvia acquisition) was a work in progress and was not an Architecture Compliant Core nor a product ready for use. [REDACTED] included the starting development of a microprocessor core intended for server markets. As I describe elsewhere in this Rebuttal Report, the [REDACTED] (as existing at the time of the Nuvia acquisition) was not [REDACTED]

3. ARM

82. Arm is a semiconductor and software design company, whose primary business is the design of central processing unit (CPU) cores that implement the ARM architecture family of instruction sets. ARM also designs other cores such as graphics processing units (GPUs) and others. Companies often license CPU core designs from Arm to manufacture and integrate the core into their own System on chip (SoC) with other components such as GPUs (sometimes their own and sometimes the Arm Mali) and modem/radio basebands (for mobile phones).

83. ARM also grants licenses that allow licensees to develop their own highly customized CPU designs that is compliant with the Arm ISA. Arm’s claims against Qualcomm relate to Qualcomm’s customized designs, not Arm designs.

B. Nature of Dispute

84. In this section, I will discuss my understanding of the dispute between Qualcomm and Arm as informed by Qualcomm’s attorneys. I understand that in its

²⁰ Qualcomm, Qualcomm to Acquire Nuvia (Jan. 12, 2021), <https://www.qualcomm.com/news/releases/2021/01/qualcomm-acquire-nuvia>

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complaint, Arm has brought a breach of contract claim against Qualcomm.²¹ D.I. 1 (Compl.) at ¶¶ 58-69. When Qualcomm announced its intent to acquire Nuvia, both Nuvia and Qualcomm had their own respective ALA in place with Arm. [REDACTED]

85. Specifically, on September 27, 2019, Nuvia and ARM entered into an ALA and a Technology License Agreement (“TLA”).²² Nuvia and ARM entered into an Annex 1 for both the ALA and TLA on September 27, 2019,²³ and then on March 27, 2020,²⁴ Nuvia and ARM entered into another Annex 1 for both the ALA and TLA. My report focuses on topics related to the Nuvia ALA in response to Dr. Colwell’s and Dr. Chen’s opinions, and I have been informed that ARM’s claims are specific to the Nuvia ALA.

86. I understand that ARM terminated the Nuvia ALA on March 1, 2022. Compl. ¶ 39. ARM claims that it “is entitled to specific performance requiring Defendants to comply with the Nuvia ALA’s termination provisions, including ceasing all use of and destroying any technology developed under the ALA.” *Id.* ¶ 68. The Nuvia ALA termination provision, [REDACTED], states as follows:

[REDACTED]

²¹ I understand that ARM has further alleged counts of Trademark Infringement and False Designation which are not relevant to the discussion in the report.

²² [REDACTED]

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[REDACTED]

[REDACTED]

87. I am not an attorney and understand that ARM and Qualcomm disagree over the meaning of “[REDACTED].”

88. [REDACTED]

[REDACTED]

89. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²⁵ For convenience, I will adopt the same naming convention to reference this document throughout my report.

²⁶ [REDACTED]

²⁷ [REDACTED]

²⁸ I am not reproducing here direct quotes from the Nuvia ALA supporting Qualcomm’s position, but I incorporate them by reference and reserve the right to use these texts and use them as demonstratives at trial.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

90.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

C. Timeline

91. I have been provided the following timeline of events:

- On May 30, 2013, Qualcomm, through its affiliate, entered into an Amended and Restated ALA and Amended and Restated Agreement with Arm. QCARM_0337857. According to this ALA, Qualcomm’s and ARM’s original ALA was dated September 29, 2003. *Id.* Qualcomm through its affiliate entered into a Technology License Agreement (“TLA”) with Arm effective as of May 30 2013 as well. QCARM_0343533. According to this TLA, the original TLA was dated September 30, 1997. *Id.* This TLA has remained in place and effective through the current day. On September 27, 2019, Nuvia and Arm entered into an ALA and TLA. [REDACTED]. Nuvia and Arm entered

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into an Annex 1 for both the ALA and TLA on September 27, 2019.

[REDACTED]. On March 27, 2020, Nuvia and Arm entered into another Annex 1 for both the ALA and TLA, which changed some of the listed deliverables, and I have been informed the 2020 Annex 1 is the controlling Annex for the Nuvia ALA, which Dr. Colwell appears to understand as the controlling Annex as well. [REDACTED].

- On January 13, 2021, Qualcomm publicly announced its intent to acquire Nuvia.

[REDACTED]

- [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

- On March 15, 2021, Qualcomm publicly announced it acquired Nuvia.²⁹

- [REDACTED]
[REDACTED]
- [REDACTED]
[REDACTED]
[REDACTED]

- [REDACTED]
[REDACTED].

- On March 1, 2022, ARM terminated the Nuvia ALA and TLA. [REDACTED].

²⁹ Qualcomm, Qualcomm Completes Acquisition of NUVIA (Mar. 15, 2021), <https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia> (last visited February 27, 2024).

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- [REDACTED]
[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]
[REDACTED]
- [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
- [REDACTED]
[REDACTED]
- [REDACTED]

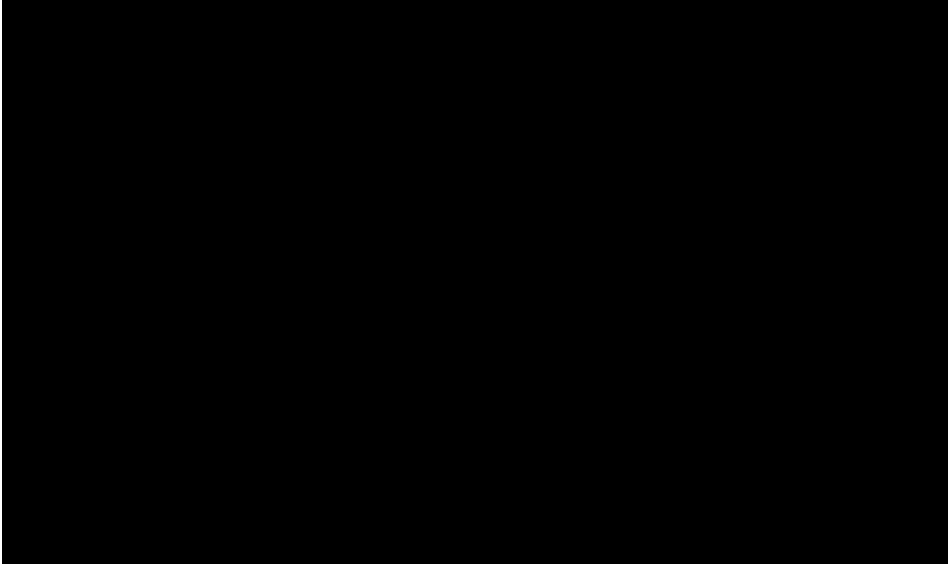
VI. THE [REDACTED] DESIGN AND QUALCOMM PRODUCT DESIGNS ARE NOT [REDACTED]

92. For context regarding Dr. Colwell’s and Dr. Chen’s analysis, it is helpful to consider what they focus on. As I discussed above, the microprocessor is one of many modules found within an SoC. The microprocessor itself includes multiple modules, and a microarchitect, among other things, designs the different modules by writing RTL code to perform an operation in such a way as to meet criteria related to the goals for the design (which are, for example, indicated by the needs of the targeted market).

93. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

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94. The SoC of the [REDACTED] is shown below:



[REDACTED]

95.

[REDACTED]

[REDACTED]

[REDACTED]

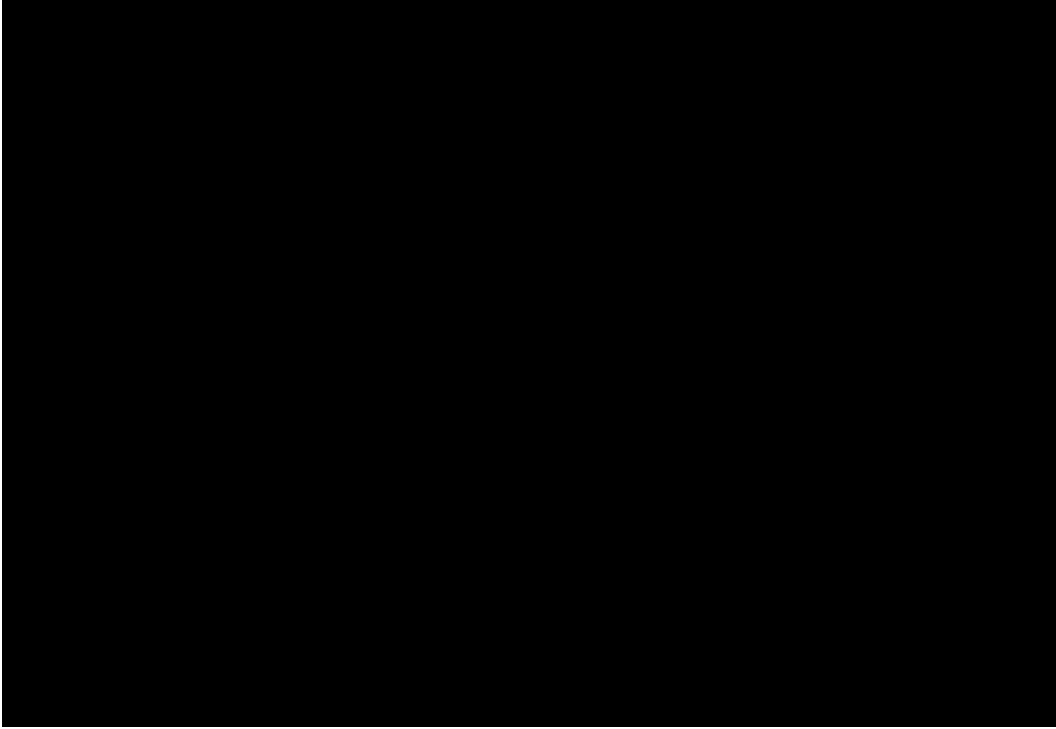
[REDACTED]

[REDACTED]

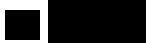
96.

[REDACTED]

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97.



A. The Arm ARM does not define a microarchitecture

98. Market needs that guide product requirements serve as the basis for microarchitecture design. ARM itself has characterized the Arm ARM as simply

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describing “what functionality the software can rely on the hardware to provide.”³⁰ A microarchitecture’s design involves choices about hardware components, their arrangement, and operational methodologies. In fact, microarchitectures that share the same architecture can differ significantly.

99. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

100. As described in greater detail below, a licensee’s (such as Nuvia or Qualcomm) design team builds their *own* microprocessors that executes operations that can be accessed through the software interface I describe elsewhere that is the Arm ARM.

1. Microarchitectural design choices greatly impact product attributes and hence product use cases

101. A microarchitecture’s design takes price, performance, and power requirements into consideration. While two microprocessors may use the same ISA, the design of each microprocessor could look and function very differently due to the innovations and design choices that designers implement. These design choices are usually governed by the requirements of the product in which the microprocessor is used. For example, a CPU for a smartphone may be designed to use less power than a CPU in a data center, even when they implement the same architecture.

³⁰ Arm Ltd., *supra* note 5, at 9.

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102. For example, a processor design for a personal mobile device, such as a smartphone, may focus more on power, media performance and responsiveness, whereas processor design for a server (which is typically a plugged-in device) would be more focused on data throughput to support multiple applications and/or users.

2. Key product characteristics depend primarily upon microarchitecture design choices, and not upon the choice of ISA

103. The differences in required product performance driving different microarchitecture design choices are independent of the choice of ISA. As an example, two processors with the same ISA but different designs are the AMD Opteron and the Intel Core i7. Both processors implement the x86 instruction set, but they have very different pipeline and cache organizations. I will discuss pipeline and cache organizations in further detail in later sections.

104. The Arm ARM does not provide a microarchitecture. Knowing that an ADD operation needs to add two numbers stored in registers, the functional description, does not say anything about how fast the ADD operation must be performed, how much power that ADD operation is allowed to burn, how the circuit design of the adder is implemented, how many transistors are needed to implement the ADD operation, how to read the data from the registers and bring them into the adder module. Once an Arm instruction is decoded the difficult work of achieving the efficient processor design is left to the designers. That is in fact the reason why Apple’s M1 chip has successfully been adapted into MAC computers. It is the innovations in the microarchitecture that create the value and product differentiation. For example, the same software application may run

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slowly on one microarchitecture and quickly on another, or it may consume more power while running on one than the other.

105. As one example in the Arm ARM, Dr. Colwell states that the Arm ARM provides information such as the “number, types and any special aspects of the general register set.” Colwell Report ¶ 59. However, Dr. Colwell did not consider that Qualcomm’s complex out-of-order processors use the concept of register renaming where architectural registers are mapped to the physical registers on the chip. Throughout the execution of the instructions it is the physical registers that are read, written and tracked.

106. As another example, I disagree with Dr. Colwell that the Arm ARM specifies the “memory hierarchy design, including caches, write buffers.” *Id.* The Arm ARM does not specify the cache configuration, such as the size of the cache in bytes, the width of each cache line, the number of such cache lines, the associativity of the cache.

107. Processors that are compliant with the ARM ISA can have a variety of microarchitectures, each balancing performance, cost, and complexity differently. Despite their internal designs being vastly different, they all execute the same programs. The table below presents a range of processors that all utilize the Arm v8.2-A ISA, but are designed for very different use cases, which in turn, leads to different microarchitecture designs.

³¹ Arm Ltd., Arm Neoverse N1 CPU (2019), <https://www.arm.com/-/media/global/products/processors/N1%20Solution%20Overview.pdf?rev=1cf46d423a6b4995809c94b14109b805&revision=1cf46d42-3a6b-4995-809c-94b14109b805>.

³² Arm Ltd., Arm Cortex-X1 Core Technical Reference Manual (r1p2 2023), <https://documentation-service.arm.com/static/64bfd6eedf6cd61d528c8a20?token=>.

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[illegible]

Exemplary ARM Processors & Use Cases

108. The uniqueness and effectiveness of a processor's microarchitecture generally become evident to computing device purchasers via the performance of the computing device.

109. There are different performance results from two different microarchitecture implementations even when holding fabrication and ISA constant.

110. Because of the impact that differences in microarchitecture can make, microarchitects need to select the microarchitectural techniques carefully based on the domains they are targeting. In Section VI, I describe these techniques in more detail, and explain how they impact the characteristics of processors like performance. As I have described above, very different microarchitectures for a microprocessor can be designed while still maintaining compatibility with an ISA.

³³ Saurabh Pradhan, *Arm Cortex-X1C: Scalable Innovation for Laptop and Desktop*, Arm Community Blogs: Announcements (Nov. 16, 2021), <https://community.arm.com/arm-community-blogs/b/announcements/posts/arm-cortex-x1c>.

³⁴ Arm Ltd., Arm Neoverse E1 (2019), <https://www.arm.com/-/media/global/products/processors/E1%20Solution%20Overview.pdf?rev=3834164b132c4cfba1ca29329b50833f&revision=3834164b-132c-4cfb-a1ca-29329b50833f>.

³⁵ Arm Ltd., Cortex-A65AE, ArmDeveloper, <https://developer.arm.com/Processors/Cortex-A65AE> (last visited Feb. 27, 2024).

³⁶ Arm Ltd., Cortex-A65AE Automotive Enhanced, https://www.arm.com/-/media/global/products/processors/product_datasheet_cortex_a65ae.pdf (last visited Feb. 27, 2024).

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3. Many custom aspects of a processor are designed to match chip objectives

111. In the past (e.g., 1970-1985), instruction set design was thought of as the primary job of computer architects. The challenges facing the computer architect beyond ISA design are particularly acute at the present, when the differences among instruction sets are small and when there are distinct application areas.

112. Computer design entails identifying the required attributes, and then building within the constraints of cost while maximizing performance and optimizing energy. Irrespective of instruction set selection, the design process hinges on functional organization, logic design, and implementation, which is reflected in microarchitecture design, manufacturing technology and choices, and many other factors. This design process encompasses aspects like integrated circuit design, packaging, power, and cooling, and further requires a broad understanding of various technologies, ranging from compilers and operating systems to logic design and packaging.

113. The ISA does not define the underlying hardware. As a result, a single architecture can be used for multiple use cases depending on the implementations. For example, Intel and Advanced Micro Devices (AMD) both sell various microprocessors belonging to the same x86 architecture. They all can run the same programs, but they use different underlying hardware and therefore offer trade-offs in performance, price, and power. Some microprocessors are optimized for high-performance servers, whereas others are optimized for long battery life in laptop computers. Often, many different microarchitectures exist for a single architecture. I describe some aspects of a microarchitecture in other sections of this report, and none of these microarchitectural

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aspects can be derived from the ISA (rather the ISA only indicates the compatibility of the microarchitecture with programs).

4. There are many similarities between ISAs

114. The purpose of an ISA is to define a set of instructions needed to communicate operations to the hardware, like a vocabulary of commands that a computing hardware understands. While there may be differences in how individual instructions are structured, the basic functionality they describe are identical. For example, almost all architectures define basic instructions, such as add, subtract, and branch, that operate on memory or registers. This similarity may be expected because general-purpose computers may all need to perform such operations. Even when there are differences between the instructions available in different ISAs, such differences in instructions generally are not fundamental limitations of processor over another. For example, an instruction available in one ISA but not another ISA, but that instruction only defines functionality that can be implemented in the other ISA through a different instruction or a combination of multiple instructions.

115. One of the primary drivers for similarity between ISAs is the commonality in foundational operation types that each ISA needs to support to aid the development of computer hardware. As described previously, computers perform operations based on machine instructions. These operations can be segmented into eight basic categories.

116. I will note, ARM itself has acknowledged the minimal differences between architectures. In an interview, when asked “How do [] architectures differ from each other?” Richard Grisenthwaite, Executive Vice President and Chief Architect of ARM, responded

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That’s a really great question because it’s easy to imagine that they will be radically different. . . . In reality, the nature of **what you can do on any particular architecture is really not that different**. . . . But in reality, the different architectures have quite a lot of **similarities in terms of functionalities they are able to offer**. **What makes an architecture successful is actually the number of people that use it**. You get this virtuous circle that as more people use your architecture, so - more people will want to use it and it becomes more popular. It’s a self-fueling prophecy.³⁷

5. Arm ARM Overview

117. In this section, I first briefly describe version 8 of the Arm Architecture Reference Manual or as referred to earlier, the Arm ARM, and its contents that describe the Arm architecture. For this section, I downloaded the Arm ARM from ARM’s public website at <https://documentation-service.arm.com/static/644a406baa78c007af74e6fd?token=> (last visited February 21, 2024, also produced [REDACTED]). I further explain that the Arm ARM only describes the architecture but does not provide an implementation of a microarchitecture. The Arm ARM includes architectural components that in order to implement as a processor require microarchitectural design, and as discussed further below, the Arm ARM does not describe microarchitectural elements.

i. Aspects of the Arm ARM

118. A microprocessor microarchitecture may be designed in such a manner as to be compatible with the software interface described in the Arm ISA, such as to perform certain operations when the microarchitecture receives a certain instruction from the Arm ISA compiled software application. In addition to the instructions, the ISA also describes the resources available to execute those instructions, such as registers, and a description of

³⁷ Arm, *What is CPU Architecture?*, YouTube (Aug. 18, 2021), <https://www.youtube.com/watch?v=KGHdDVLnKJM> transcribed from audio.

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how applications running on processors are expected to gain access to other key components such as memory resources. In the case of Arm, such architectural details are communicated to programmers and microarchitects through the Arm ARM. More specifically, the Arm ARM contains the following components:

- **Introduction to the Arm Architecture** – Part A of the Manual introduces the Arm architecture and describes the foundational concepts and designs associated with it, such as:
 - The Arm Architecture is a RISC (reduced instruction set computer) architecture with a large uniform register file and a load/store architecture with simple addressing modes. The Arm Architecture does not specify particular performance requirements or aspects and thus supports implementations across a wide range of performance points. [REDACTED]
 - The Arm Architecture is backward compatible, i.e., later versions of the architecture feature only additive changes over previous versions. For example, Section A2.9.1 describes the additional features added in v8.7 over previous versions. [REDACTED].
 - The Arm Architecture features two execution states, or two different sizes of registers available to applications, called Aarch64 (64-bit registers) and Aarch32 (32-bit registers). [REDACTED].
- **Application Level Architecture** – Part B of the Arm ARM provides the details of the Arm Architecture required for application development. [REDACTED]. It describes the resources the Arm Architecture provides to any general application, i.e., an application

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that runs on a microprocessor but does not control the microprocessor itself. Examples of resources that a microprocessor must make available include registers (both general and special purpose) for use by instructions, and options available for an application when instructions are executed in an unexpected manner. [REDACTED]

- **Instruction Set** – The Manual includes the Arm ISA and describes the types or classes of instructions, such as data processing instructions (e.g., arithmetic operations and load and store instructions to operate on memory), control instructions (e.g., branches that direct the overall flow of an application), and finally system instructions that can be used to signal other information to the microprocessor itself. [REDACTED] [REDACTED]. It also includes the encoding, i.e., the meaning of each binary bit in an instruction, and the order of the bits. Part C of the Arm ARM describes the instructions required for Aarch 64 while Part F describes those required for Aarch32. [REDACTED].
- **System Level Programmer’s Model** – While the Application Level Programmer’s model describes how microprocessors compatible with the Arm Architecture function from the perspective of a general application, the System Level Programmer’s Model describes resources available to developers of system software like Operating Systems that are capable of controlling the microprocessor and other general applications. The Arm ARM describes Exception Levels (EL) that an application must be allotted, which in turn determines the resources that must be made available. [REDACTED]

Furthermore, the System Level model also describes how an Arm Architecture-compatible microprocessor accesses the memory resources available to it and other features such as the debug and trace capabilities. Part D of the Arm ARM describes

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the system level architecture for AAarch 64, and Part G does the same for Aarch 32.

[REDACTED]

119. Additional features of the Arm Architecture such as an external debug, i.e., a facility by which an Arm Architecture-compatible processor can be inspected by another external microprocessor unit when applications are improperly executing, and requirements for memory mapped components are included in Part H and I of the Arm ARM. [REDACTED]

120. The Arm ARM’s purpose is to provide details of the Arm Architecture, and “is not intended to describe how to build an implementation of the PE [processing element].” [REDACTED] The Arm ARM describes various components of the Arm Architecture but not how to build a specific microprocessor that is compatible with the Arm Architecture. ARM makes this very clear in its own documentation as it explains the difference between architecture and microarchitecture, stating that “Architecture does not tell you how a processor is built and works. The build and design of a processor is referred to as micro-architecture. Micro-architecture tells you how a processor works.” Arm Ltd., *supra* note 5, at 12.

121. In the excerpt reproduced below, ARM describes the information found in the Arm ARM, namely the Instruction set, Architectural registers, Memory model, and Exception model:

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY**What information will I find in each document?**

The following table shows which information is shown in the different types of documents:

	Architecture			Micro-architecture	Micro-architecture	
	Arm Architecture Reference Manual	GIC specifications	AMBA specifications	TRM	CIM	SoC Datasheet
Instruction set	x					
Instruction cycle timings				x		
Architectural registers	x	x				
Processor specific registers				x		
Memory model	x					
Exception model	x					
Support for optional features				x	x (some might be synthesis choice)	
Size of caches/TLBs				x		
Power management				x		
Bus ports				x	x	
All legal bus transactions			x			
Bus transactions generated by processor				x		
Memory map						x
Peripherals						x
Pin-out of SoC						x

Excerpt of Introducing the Arm Architecture³⁸

122. ARM describes what is included in each of categories when discussing its meaning by architecture in the following excerpts:

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3. What do we mean by architecture?

When we use the term architecture, we mean a functional specification. In the case of the Arm architecture, we mean a functional specification for a processor. An architecture specifies how a processor will behave, for example what instructions it has and what the instructions do.

You can think of an architecture as a contract between the hardware and the software. The architecture describes what functionality the software can rely on the hardware to provide. Some features are optional, as we explain in Architecture and micro-architecture.

The architecture specifies:

	Description
Instruction set	The function of each instruction
	How that instruction is represented in memory (its encoding)
Register set	How many registers there are
	The size of the registers
	The function of the registers
	Their initial state
Exception model	The different levels of privilege
	The types of exceptions
	What happens on taking or returning from an exception
Memory model	How memory accesses are ordered
	How the caches behave, when and how software must perform explicit maintenance
Debug, trace, and profiling	How breakpoints are set and triggered
	What information can be captured by trace tools and in what format

Excerpt of Introducing the Arm Architecture³⁹

123. As shown in the prior excerpt above, ARM itself characterizes the Arm ARM as a functional specification that simply “describes what functionality the software can rely on the hardware to provide.” *Id.* Notably, neither the software nor the hardware referred to here is Arm’s but instead Qualcomm’s and other software vendors. As further shown in the excerpt above, Arm acknowledges that the Arm ARM does not provide instruction cycle timings, processor specific registers, support for options features, size of caches/TLBs, power management, bus ports, and bus transactions generated by processor

³⁹ [REDACTED]

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that among many design choices when creating a microarchitecture.⁴⁰ The Arm ARM further does not include a memory map, peripherals, or pin-out information for SoC design.⁴¹ Each of these must be designed by a microprocessor designer to perform these operations in accordance with other design goals and trade-offs chosen by the designer.

ii. Implementation Defined

124. As described above, aspects of the Arm architecture specified the Arm ARM include the instruction list, the memory and programming models. Per Arm, while the architecture describes the rules associated with each of these components, it does not describe the implementation of a specific microarchitecture. [REDACTED]

125. This concept becomes strengthened by the fact that the Arm ARM declares multiple aspects of architectural components as “Implementation Defined,” which per the Arm ARM, is behavior that is not part of the Arm Architecture but is defined by the individual implementations, i.e., that designers are to make the appropriate design decisions and build the appropriate hardware. [REDACTED]. In fact, the term “Implementation Defined” appears nearly 5000 times in the Arm ARM across the various sections described in the previous section.

126. Implementation defined architectural components exist across all aspects of the Arm ARM that I described before. I will describe them through taking example from the instruction set component itself.

127. As described in the prior section, the Arm ARM lists instructions that can be executed by a microprocessor, the functionality they are supposed to provide, and the architectural registers, which are different than the actual physical registers in the processor

40 [REDACTED]

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that are available to the instructions. The implementation of the instruction (i.e., the HDL logic used to describe its functionality and the hardware that provides the functionality) is part of the microarchitecture and therefore not specified in the Arm ARM. In some cases, parts of an instruction’s behavior are also declared as “implementation defined.” For example, the Arm Architecture includes the CPYFP instruction (a Memory Copy Forward Only operation). This instruction is used to copy data between indicated memory locations. While the instruction would contain rules for the allowed memory locations (e.g., what types or portions of memory must be capable of being copied using the instruction), the exact amount of memory that can be copied with a single use of the instruction is implementation defined. Per the Arm ARM designers optimize the memory sizes based upon their requirements for the intended use cases. Such optimization is defined as part of the overall microarchitecture design.

128. The table below provides a (non-exhaustive) list, and descriptions of implementation defined behavior that are left to the discretion of the microarchitect.

Category	Example	Source⁴²
Exception Model	Prioritization of interrupts	D1-5383
Exception Model	Floating-point exception handling	D1-5372
Instruction Set	Size of memory blocked for exclusive access by Load-Exclusive Instruction	B2-225
Instruction Set	Behavior of Store-Exclusive instruction in relationship to Load-Exclusive Instruction	B2-226
Instruction Set	Encoding for Implementation Defined Instructions	C5-743
Instruction Set	Size of memory impacted with CPYFP and CPYFM instructions	C6-1366
ISA Independent Microarchitecture	Memory Hierarchy	B2-198

⁴² Page numbers refer to the Arm Architecture Reference Manual for A-Profile Architecture, Issue J.a., *supra* note 4.

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Category	Example	Source⁴²
ISA Independent Microarchitecture	Instruction Prefetching	B2-201
ISA Independent Microarchitecture	Cache Prefetching/Preloading	B2-202
Application-Level Programmers’ Model	Size of memory region for memory-mapped peripherals	B2-183
System Level Programmers’ Model	Powering of Core domains and Debug domains	D1-5392
System Level Programmers’ Model	Behavior of caches during resets	D1-5393
Application-Level Programmers’ Model	Maximum length of Floating-Point Control and Floating Point Status Registers (FPCR, FPSR)	B1-148
Application-Level Programmers’ Model	Behavior of SSBS register during warm reset	C5-842

Examples of Implementation Defined behavior in the Arm architecture**B. [REDACTED] Significant Engineering Effort**

129. [REDACTED]

[REDACTED] As discussed in the previous section, the Arm ARM does not provide details on how to build a microarchitecture including an SoC design. Qualcomm’s originality and creativity is expressed in two primary manners: its design choices and the implementation of those design choices.

1. Originality and Creativity in Microarchitecture

130. In this section I discuss some microarchitectural features that differentiate various implementations of the same architecture. Even with small changes to their size or implementation, design decisions can potentially have significant performance

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consequences resulting in very different microprocessors (although those different microprocessors may all be compatible with the Arm ISA).

i. Cache Organization, Access, & Performance

131. To execute instructions, the datapath portion of the processor accesses pieces of memory, potentially both outside and within the microprocessor. The organization and implementation of memory access involves many trade-offs for the microarchitecture design and performance.

132. There exists a hierarchy of memory that the processor accesses: registers, caches, memory, and storage. Caches and registers are within the processor, while memory and storage are outside the processor. Organization and access to registers and caches are differentiating factors for microarchitecture because the faster the processor can access data, the faster it can execute instructions on that data. Register files, being small and fast, are preferred for storing frequently used variables, while memory, which is larger and slower, is used for less frequently accessed data. In the context of the ARM architecture, all operations are performed directly on registers. Therefore, any data that is initially stored in memory needs to be transferred to a register before any processing can occur. A designer designs where data is stored and how the data is transferred in and out of registers to other memory.

133. In general, the smaller the memory, the faster is its speed, and the faster the memory, the more expensive the memory (in terms of dollars) which holds true across all applications. Memory hierarchy is organized differently according to different market specifications.

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134. One of the aims of a competitive microarchitecture is to speed up the access and retrieval of cache. For example, one technique to reduce the time a microprocessor takes to find a data item in a cache (also called cache “hit” time) is way prediction. Using a way prediction technique, extra bits are kept in the cache to predict the way (or the block within the set) of the next cache access. A designer’s implementation of prediction and the design choices the process entails are not specified by the ISA.

135. Another improvement on cache access is decreasing the proportion of references to a level of the memory hierarchy (e.g., cache) in which the requested data is not found in the requested level, and therefore needs to be fetched from elsewhere. This is referred to as a “miss rate.” One technique to reduce cache miss rate is called hardware prefetching. As the name implies, this technique prefetches items before the processor requests them. Data and instructions can be prefetched into caches or an external buffer, both are quicker to access than main memory. For example, a microprocessor can fetch two blocks on a miss (1) the requested block and (2) the next consecutive block. Here the requested block is placed into the instruction cache, and the prefetched block is placed into the instruction stream buffer. The original cache request is canceled if the requested block is in the instruction stream buffer. Like way prediction, hardware prefetching and its design are not specified by an ISA.

136. The access to cache and the speed or accuracy of it are not the only differentiating attributes of a microarchitecture implementation related to caches. Microarchitecture corresponding to the cache hierarchy also requires, for example, policies and algorithms for storing data in the cache or removing it, e.g., spatial or temporal caching, all of which impact the performance of a microprocessor and are not specified by the ISA.

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY**ii. Parallelism**

137. As the name implies, parallelism involves performing tasks in parallel instead of sequentially. In a microarchitecture, parallelism is a technique that improves the speed and hence the throughput of instruction execution. Implementation of parallelism comes in two forms – spatial and temporal. Spatial parallelism involves the use multiple copies of hardware so that multiple tasks can be done at the same time, and using temporal parallelism a task is broken into stages, like an assembly line. Spatial parallelism is part of a microprocessor design in “multicore processors,” and temporal parallelism is part of microprocessor designs in “pipelining.” Both concepts are described further below.

iii. Pipelining

138. The figure reproduced below shows how pipelining allows for more instructions to be executed in the same amount of time when compared to a non-pipelined processor (i.e., single-cycle processor) for a simple 5-stage pipeline. Pipelining is not simple, and its implementation introduces complexity and impacts power and performance.

139. Even with the improvements made, pipelining introduces complexities called hazards (structural, data, and control); control hazards occur when executing instructions related to branching. To address these hazards, a technique referred to as branch prediction is used that assumes the outcome for a conditional branch opposed to waiting for an actual outcome. However, branch prediction introduces the possibility of misprediction, which also affects performance.

140. While these techniques affect performance, neither the pipelining nor the staging or branch prediction design of a microarchitecture is defined by the ISA.

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iv. Multicore Processors

141. In addition to implementing instruction-level parallelism techniques, data-level parallelism can be leveraged for further performance improvements. A multiprocessor system consists of multiple processors or cores and a method for communication between the processors. Multiple cores in a microprocessor can improve performance, but it also increases overall complexity and requires additional design considerations.

142. Memory organization and access for multiple processors is one design decision a designer makes when implementing a multicore design. There are many multicore design choices available, including centralized shared memory design and distributed shared memory design. This decision depends on how the multicore processors are designed to act harmoniously, and each option has its own complexities during implementation. Similar to pipelining, an ISA does not describe the microarchitecture design and implementation of a multicore processor.

143. As discussed previously, as acknowledged by Arm’s own documentation, the Arm ARM does not provide a microarchitecture.

2. [REDACTED]

144. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

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i. [REDACTED]

145. The [REDACTED], which was designed by Nuvia and Qualcomm independently from any ARM Technology under their respective ALAs, contained Qualcomm’s custom-designed [REDACTED]. [REDACTED] was designed to be compatible with the Armv8.7 architecture. Neither Dr. Colwell nor Dr. Chen provide analysis of the [REDACTED] codebase or microarchitectural design, which is not surprising given that the Arm ARM does not provide an SoC design.

146. SoCs encapsulate entire systems integrated onto a single die or multiple dies, where the CPU is one component. SoCs may include memory controllers, I/O interfaces, hardware accelerators, etc., all based on target application areas. [REDACTED]. SoC design requires detailed understanding of packaging, I/O pin behaviors and none of these aspects are part of any ARM Technology. The Arm ARM does not contain any information related to the development of an SoC, as Mr. Grisenthwaite acknowledged at his deposition, and further for the reasons I describe above about what the Arm ARM contains. *See* Grisenthwaite Tr. at 220:10–13 (“Q The ARM ARM does not provide information on how to make an SOC, does it? A No.”).

147. The [REDACTED] [REDACTED]
and [REDACTED]
[REDACTED]
[REDACTED] [REDACTED]
[REDACTED]

148. [REDACTED]
[REDACTED] [REDACTED]

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149.

150.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

160. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

161.

■

ii.

■

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HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

165. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

11

114

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HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]). [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

172. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

173.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

174.

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED].

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

177.

(b)

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

181.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(c)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

185.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

- [REDACTED]
[REDACTED]
[REDACTED]
- [REDACTED]
[REDACTED]
■ [REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

(e) Globals Unit (GBL)

188.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(f)

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].

197. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED] :

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

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HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

(g)

[REDACTED]

200.

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

201. [REDACTED]

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Question	Percentage of 'Yes' Responses
1. Are you a member of a religious organization?	~45%
2. Do you believe in God?	100%
3. Do you believe in the Bible?	~65%
4. Do you believe in the resurrection of the dead?	100%
5. Do you believe in the Last Judgment?	~60%
6. Do you believe in the Virgin Mary?	~75%
7. Do you believe in the saints?	~85%
8. Do you believe in the angels?	~85%
9. Do you believe in the Devil?	100%
10. Do you believe in hell?	~10%
11. Do you believe in the resurrection of the dead?	~85%
12. Do you believe in the Last Judgment?	~55%
13. Do you believe in the Virgin Mary?	~95%



7

The first two studies were conducted by researchers at the University of California, San Diego, who found that people who had been exposed to a traumatic event were more likely to experience post-traumatic stress disorder (PTSD) if they also had a history of trauma or abuse. This finding was consistent across both studies, suggesting that past experiences can significantly influence how individuals respond to new traumas.

In a third study, researchers from the University of Michigan explored the role of social support in mitigating the effects of trauma. They found that individuals who received strong emotional support from family or friends after a traumatic event were less likely to develop PTSD compared to those who did not receive such support. These findings highlight the importance of community and social networks in helping individuals cope with adversity.

██████████

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[illegible]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY**C. The ACK Does Not Provide Information for [REDACTED] Microprocessor Nor Is It [REDACTED] in a Microprocessor**

208. Dr. Colwell contends that the “ARMv8-A Architecture Compliance Kit,” is included in [REDACTED]. [REDACTED]. The ACK for short is a set of tests that are used to determine compliance of a microprocessor design with the Arm ISA. That is, the ACK determines whether the microprocessor is compatible with the Arm ISA. These tests produce nothing other than output values that can be compared to an “answer key” to determine if the microprocessor produced the expected result that an Arm ISA-compatible microprocessor would produce. This allows Arm to verify that different microprocessor designs from different Arm licensees produce consistent results, and allows application developers to be confident that their applications will work across different microprocessors. The ACK tests do not create or modify the microarchitecture RTL or product designs, nor do they provide instructions to a microarchitect as to how to fix any identified failures. *See*, Agrawal Tr. at 34:8–17; Grisenthwaite Tr. at 92:8–10.

[REDACTED]

209. I understand that Qualcomm’s position is that the ACK is not [REDACTED] [REDACTED] under the Nuvia ALA based on interpretation of the definition of Annex 1 of the Nuvia ALA and testimony from Mr. Grisenthwaite. Nevertheless, even if the ACK is considered [REDACTED], I do not believe that any of the Qualcomm Cores or products were [REDACTED].

210. Neither the tests themselves nor the outputs of the tests provide information from which a designer can design a microprocessor. Dr. Colwell opines that “an ARM licensee would . . . not[e] which tests passed and which did not, as a way of focusing the development team on the parts of the design that were not yet implemented correctly.”

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Colwell Report ¶ 81. This assertion is not correct. Microarchitecture designers and circuit designers have to create their own unit level tests to test the microarchitecture implementation’s correctness. These unit level tests have a huge complexity that far outweighs the complexity of the Arm ACK as I describe in the next paragraph. The ACK can only point to an issue that does not demonstrate compatibility with the Arm ISA. However, there is no content in the ACK’s report analysis to instruct the designer to make a certain change in the microarchitecture. At most, the output is a flag to look at a particular portion of the microarchitecture. This should be expected because, as I describe above, a microarchitecture is a very custom and unique aspect of a microprocessor that reflects the creativity and decisions of the designer. Given the infinite number of potential microarchitectures that can be Arm ISA-compatible, generic tests such as those in the Arm ACK could never provide useful information to a designer for how to revise or fix any aspect of the microarchitecture design that may have failed a test for their particular microarchitecture design. [REDACTED]

211. The test suites that Arm provides cannot test the microarchitecture innovations in Qualcomm’s Cores because it is not possible to provide test suites for features that Arm does not even know exist in a given processor. For instance, Arm test suites do not know the presence of features such as branch order buffers, caches with specific configurations. The Arm test suites only provide instruction functional testing. For instance the test suites may run an Arm ADD instruction with two known inputs and compare the computed output with the known value. But such a test cannot determine the speed or the power consumption of such an operation in Qualcomm’s own processors.

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ARM support does not resolve the microarchitectural bugs that may arise in Qualcomm's implementations. The support team does not provide microarchitecture.

212.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

E. No Core Was an [REDACTED] Under the Nuvia ALA

216. Dr. Colwell concludes that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Colwell Report ¶ 145. I [REDACTED]

[REDACTED]

[REDACTED].

217. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

218.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

219.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

■ [REDACTED]

220.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	7	7

[REDACTED]

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

1. [REDACTED]
2. [REDACTED]
- [REDACTED]
- [REDACTED]

=====

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

■ [REDACTED]

...

■ [REDACTED]

[REDACTED]

■ [REDACTED]

[REDACTED]

■ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED]	

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

them.

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

...

[REDACTED]

[REDACTED]

Reference	Document number	Author(s)	Title
1	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]

...

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

227. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

229. [REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

F. Qualcomm’s Product Designs are

230.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

231.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

232. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

233. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

45 [REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

234.

[REDACTED]

[REDACTED]

235.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

236.

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

237.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

238.

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

239. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

240. [REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

241. [REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

242. [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

243. [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

244. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

245. [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

246. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

247. [REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

248. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

249.

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

250.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

251.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

252.

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

VII. QUALCOMM’S CODEBASES DO NOT SUPPORT DR. COLWELL’S OR DR. CHEN’S OPINIONS

253. Dr. Colwell opines that “the March 14, 2021, [REDACTED] is [REDACTED]

[REDACTED]

[REDACTED] and [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] *Id.* ¶166. Surprisingly, Dr. Colwell attempts to support his opinions using the high-level comparison analysis of different codes bases, none of which were written by Arm, as performed by Dr. Chen and his single day of review of the Qualcomm Codebases produced in this case. *Id.* ¶¶156-167. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

254. First, Dr. Chen’s quantitative conclusions—[REDACTED] [REDACTED]

[REDACTED]—even if true, does not demonstrate that Qualcomm’s Product Designs after March 14, 2021 are

[REDACTED]

[REDACTED]. This RTL code was developed independently by Nuvia, and Dr. Chen, under his quantitative analysis, has not shown otherwise.⁴⁷

255. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁴⁷ I have been informed by counsel that [REDACTED]
[REDACTED] Dr. Colwell and Dr. Chen did not offer any opinions regarding Qualcomm’s development efforts under its ALA. If Dr. Colwell or Dr. Chen are permitted to do so in the future, I reserve the right to respond.

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256. I have been informed that the termination obligations in [REDACTED] of the Nuvia ALA only concern the [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED] [REDACTED] Accordingly, my understanding is that the comparison of the various Qualcomm Cores is an inappropriate examination, as the appropriate test is to determine whether the Qualcomm Cores are [REDACTED]
[REDACTED] Nevertheless, I have examined Dr. Chen’s analysis and Dr. Colwell’s reliance on Dr. Chen’s findings.

257. Moreover, as I will further explain below, Dr. Chen’s analysis and conclusions are fundamentally flawed and do not support Dr. Colwell’s opinions.

A. Dr. Chen’s quantitative comparisons are unreliable

258. For his quantitative analysis, Dr. Chen compared “[REDACTED]
[REDACTED]
[REDACTED] Dr. Chen describes that he performed his quantitative analysis in two ways by: “(1) identifying key folders and comparing files within those folders across different SOC/core versions, and (2) identifying top-level RTL

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files of key building blocks and comparing each of the RTL files across different SOC/core versions.” *Id.* ¶ 26.

259. Based on his quantitative analysis, Dr. Chen concludes that [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED] 18. However, in my opinion, as explained further below, Dr. Chen’s quantitative analysis is unreliable because he ignored a majority of Qualcomm’s Codebases, omitted critical folders and files, and chose too large of a skew tolerance when he compared Qualcomm’s Codebases.

1. Dr. Chen’s comparisons omit a majority of Qualcomm’s Codebases, including critical folders and files

260. As a preliminary matter, I will note that Dr. Chen’s quantitative analysis ignores a majority of the Qualcomm Codebases for Qualcomm’s Product Designs yet also fails to constrain his analysis to code that is allegedly [REDACTED]

[REDACTED] [REDACTED] [REDACTED] [REDACTED]
[REDACTED]. *Id.* ¶¶ 28, 33. As further

discussed below, by selecting a limited set of folders and files, and further ignoring portions of Qualcomm’s Codebases that are critical, Dr. Chen’s analysis is unreliable

i. Folders Excluded from Analysis

261. [REDACTED]

[REDACTED]
[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY

[illegible]

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265. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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by ignoring all the other files in a folder, Dr. Chen’s quantitative analysis misses important features and unique implementations of each individual CPU block. Typically, the top-level file for a CPU module lists the constituent submodules and how they are connected to each other. However the functional details of the CPU block are usually described in the submodule files rather than the top level file. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].

2. Dr. Chen’s quantitative comparisons are meaningless

269. Not only did Dr. Chen’s quantitative analysis omit a majority of Qualcomm’s Codebases including crucial folders and files, but the comparison criteria used does not yield reliable outcomes. For his quantitative analysis to compare the folders and files above, Dr. Chen used a tool named Beyond Compare. Chen Report ¶ 27. Dr. Chen presents two values for the folders and files above, “File name similarity” and “Line similarity.” These are presented in Tables 2 – 6 and 8 – 12 of the Chen Report. I found that the “Line Similarity” values vary significantly based on (1) the choice of folders and files and (2) the choice of Skew Tolerance value in Beyond Compare, the tool used for comparison.

270. According to Dr. Chen, the “File name similarity” values reflect the percentage of files in a folder that have identical names to files in the folder of the same

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name in the baseline version of the code while “Line Similarity” values reflect the percentage of identical lines between two versions of a folder or file of the same name. As a preliminary matter, two file names could be identical but their content could be different. Two directory structures may be similar but their directory contents could be different. To calculate the “Line Similarity” metric, Dr. Chen uses the Beyond Compare tool and describes that he (1) generates a statistical report using the “folder comparison” function of Beyond Compare, and (2) calculates the “Important line similarity” between two files which he describes as the result of dividing the “Number of identical important lines” with the total number of “Original important lines”.

271. Beyond Compare assesses the lines of code similarity between two versions of code files by selecting each line of code in one file (say an earlier version) and assessing its existence in another file (later version). One of the important configurations in Beyond Compare is called the “skew tolerance.” The skew tolerance defines the number of lines within the later version of file that the software will use to look for the purported line of code from the older version. For example, a skew tolerance (ST) of 2000, a default value in the software, implies that a given line from the older version is compared with all the lines of code that are 2000 lines ahead of and after it in the newer version. Dr. Chen uses 2000 as the skew tolerance while calculating the “Line similarity” values. *Id.* ¶ 27.

272. While his report does not sufficiently describe his method for calculating identical important lines, through his notes (QCARM_7517717 (shared separately as part of his report)), I was able to assess his method. [REDACTED]

[REDACTED]

[REDACTED] Additionally, the “identical important lines” are

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calculated for the entire folder although Dr. Chen describes it as for individual files in his report. Chen Report ¶ 32 .

273. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

274. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

ID	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
1	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
2	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
3	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
4	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
6	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
7	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
8	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
9	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

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[illegible]

**Average line similarity values for folders included and excluded by Dr. Chen,
and overall average at a Skew Tolerance value of 2000**

[illegible]

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[illegible]

Line similarity values for files excluded by Dr. Chen at a Skew Tolerance value of 2000

[illegible]

Average line similarity values for files included and excluded by Dr. Chen, and overall average at a Skew Tolerance value of 2000

275. Dr. Chen's results, in addition to being dependent on the choice of folders and files, also vary based on the Skew Tolerance (ST) setting of Beyond Compare. As described earlier, Dr. Chen uses the Beyond Compare tool to perform his quantitative analysis. Within Beyond Compare, he sets the ST value to the default value of 2000. The effect of the ST setting on Dr. Chen's results is illustrated in the tables below. To produce

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these tables, I have followed the steps described by Dr. Chen on folders and files chosen by him with the only difference being that I used two different Skew Tolerance (ST) values. First, I selected a value of 100 for the Skew Tolerance setting (ST100). Then I used the “Unaligned” setting which is the equivalent of a Skew Tolerance value of 0 (ST0) i.e., it directs Beyond Compare to count two lines as identical only when they are in the exact same position across both versions of a file. Therefore, only files that have a 100% similarity under ST0 settings are identical copies.

276. As evident from the tables, the line similarity values at ST 100 and ST0 are lower than those at ST2000, both at folder and file level calculations, and in particular no file or folder in any snapshot is an identical copy of a file or folder of the same name in the baseline version. It is also evident that the ST parameter is an important variable that affects the output similarity values. Dr. Chen provides no support whatsoever for using 2000 as the Skew Tolerance value. Chen Report ¶ 27.

[illegible]

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No.	Name	Date		
		Month	Year	Day
1	John Doe	1	2020	15
2	Jane Smith	2	2020	20
3	Michael Johnson	3	2020	25
4	Sarah Williams	4	2020	30
5	David Brown	5	2020	10
6	Emily Davis	6	2020	15
7	Robert Miller	7	2020	20
8	Lisa Wilson	8	2020	25
9	James Taylor	9	2020	30
10	Amanda Moore	10	2020	10
11	Christopher Lee	11	2020	15
12	Michelle Garcia	12	2020	20
13	Daniel Martinez	13	2020	25
14	Stephanie White	14	2020	30
15	Kevin Black	15	2020	10
16	Nicole Green	16	2020	15
17	Brandon Hall	17	2020	20
18	Kristen Young	18	2020	25
19	Jason King	19	2020	30
20	Lauren Scott	20	2020	10
21	Eric Adams	21	2020	15
22	Kimberly Baker	22	2020	20
23	Matthew Nelson	23	2020	25
24	Christina Hill	24	2020	30
25	Andrew Ward	25	2020	10
26	Rebecca Cook	26	2020	15
27	Gregory Bell	27	2020	20
28	Heather Evans	28	2020	25
29	Timothy Roberts	29	2020	30
30	Angela Turner	30	2020	10
31	Benjamin Phillips	31	2020	15
32	Megan Campbell	1	2021	20
33	Nathan Parker	2	2021	25
34	Olivia Reed	3	2021	30
35	Peter Gray	4	2021	10
36	Quinn Hall	5	2021	15
37	Rachel King	6	2021	20
38	Samuel Lee	7	2021	25
39	Tina Scott	8	2021	30
40	Umar White	9	2021	10
41	Victoria Black	10	2021	15
42	Walter Green	11	2021	20
43	Xavier Brown	12	2021	25
44	Yara Davis	13	2021	30
45	Zoe Miller	14	2021	10

ID	Name	Performance Metrics			
		Q1	Q2	Q3	Q4
1	John Doe	85	78	92	88
2	Jane Smith	72	81	89	75
3	Michael Brown	91	84	76	87
4	Sarah White	68	73	82	79
5	David Green	88	79	85	80
6	Emily Black	75	83	77	86
7	James Grey	82	76	80	74
8	Alice Blue	70	85	78	81
9	Robert Red	87	72	83	77
10	Olivia Yellow	74	80	86	73
11	William Purple	89	75	81	84
12	Sophia Pink	71	82	79	76
13	Benjamin Orange	86	77	84	80
14	Charlotte Green	73	81	78	75
15	Lucas Blue	80	74	82	79
16	Hannah Yellow	76	83	77	85
17	Ethan Purple	84	78	80	76
18	Avery Pink	72	80	86	74
19	Isaac Orange	88	75	81	83
20	Madison Green	70	82	79	77

ID	Name	Performance Metrics		
		Speed (km/h)	Endurance (km)	Efficiency (%)
001	John Doe	120	500	85
002	Jane Smith	115	480	82
003	Michael Johnson	130	520	88
004	Sarah Williams	110	460	80
005	David Brown	125	510	86
006	Emily Davis	118	490	83
007	James Wilson	122	505	84
008	Alice Taylor	112	470	79
009	Robert Miller	128	515	87
010	Olivia Moore	116	485	81
011	William Clark	124	508	85
012	Isabella Lewis	114	475	80
013	Benjamin Hall	126	512	86
014	Mia King	117	488	82
015	Ethan Scott	121	502	84
016	Ava Green	111	465	78
017	Noah Adams	129	518	87
018	Sophia Baker	119	492	83
019	Liam Nelson	123	507	85
020	Charlotte Hill	113	472	79

Date	Time	Location	Activity	Remarks
2023-10-27	08:00	Field Station	Sample Collection	Collected 5 samples from the study area.
2023-10-27	09:30	Field Station	Sample Collection	Collected 3 samples from the study area.
2023-10-27	11:00	Field Station	Sample Collection	Collected 4 samples from the study area.
2023-10-27	13:00	Field Station	Sample Collection	Collected 2 samples from the study area.
2023-10-27	15:00	Field Station	Sample Collection	Collected 3 samples from the study area.
2023-10-27	17:00	Field Station	Sample Collection	Collected 1 sample from the study area.
2023-10-28	08:00	Field Station	Sample Collection	Collected 6 samples from the study area.
2023-10-28	09:30	Field Station	Sample Collection	Collected 4 samples from the study area.
2023-10-28	11:00	Field Station	Sample Collection	Collected 5 samples from the study area.
2023-10-28	13:00	Field Station	Sample Collection	Collected 3 samples from the study area.
2023-10-28	15:00	Field Station	Sample Collection	Collected 2 samples from the study area.
2023-10-28	17:00	Field Station	Sample Collection	Collected 1 sample from the study area.
2023-10-29	08:00	Field Station	Sample Collection	Collected 7 samples from the study area.
2023-10-29	09:30	Field Station	Sample Collection	Collected 5 samples from the study area.
2023-10-29	11:00	Field Station	Sample Collection	Collected 6 samples from the study area.
2023-10-29	13:00	Field Station	Sample Collection	Collected 4 samples from the study area.
2023-10-29	15:00	Field Station	Sample Collection	Collected 3 samples from the study area.
2023-10-29	17:00	Field Station	Sample Collection	Collected 2 samples from the study area.
2023-10-30	08:00	Field Station	Sample Collection	Collected 8 samples from the study area.
2023-10-30	09:30	Field Station	Sample Collection	Collected 6 samples from the study area.
2023-10-30	11:00	Field Station	Sample Collection	Collected 7 samples from the study area.
2023-10-30	13:00	Field Station	Sample Collection	Collected 5 samples from the study area.
2023-10-30	15:00	Field Station	Sample Collection	Collected 4 samples from the study area.
2023-10-30	17:00	Field Station	Sample Collection	Collected 3 samples from the study area.

[illegible]

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[illegible]

[illegible]

[illegible]

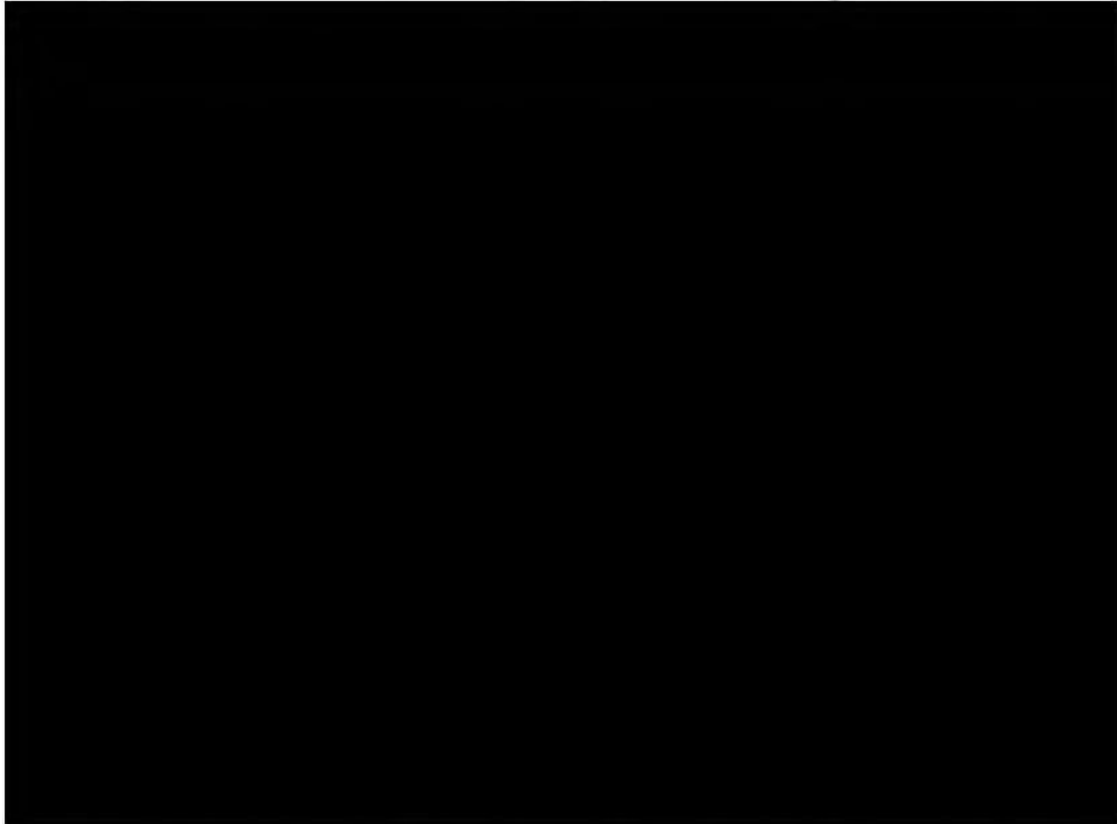
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277. Given the total number of lines of codes present in each folder, the ST 2000 value used by Dr. Chen is simply an inaccurate parameter. To demonstrate this I calculated the mean and median values for the total number of lines in the folders and files used by Dr. Chen. The table below shows the results. As is evident from the tables, the ST 2000 value used by Dr. Chen comes nowhere closer to any values in the table. Thus, if a line of code appears anywhere in the entirety of the other file that is being compared, Dr. Chen considers such a line to be similar for his analysis. Considering that the choice of ST has such an outsized effect on Dr. Chen’s results and given the lack of proper support for an ST value of 2000, Dr. Chen’s analysis cannot reasonably support his conclusions.

1						
2						
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11						
12						
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14						

ID						
1						

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280. If the lines in the Left and Right file are identical, then the excerpt shows the two matching lines. For example, the matching of the curly brace “}” is reported as a matching line in the above excerpt as line 53 in the left file and line 340 in the right file. Clearly, a curly brace match says nothing about the code in this example. When two lines differ, they separate and are shown individually.

281. Taken together, Dr. Chen’s quantitative analysis is unreliable because he ignored a majority of Qualcomm’s Codebases, omitted critical folders and files, and chose

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too large of a skew tolerance when he compared Qualcomm’s Codebases. For example, when view with proper criteria, when compared, Qualcomm’s Codebases have a low level of similarity. [REDACTED]

[REDACTED]

[REDACTED]

282. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].

1. [REDACTED]

283. [REDACTED]

[REDACTED],

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]” [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

284. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].

2. [REDACTED]

285. [REDACTED]

[REDACTED]

50 [REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

286.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

287.

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

288. [REDACTED]

[REDACTED]

289. [REDACTED]

[REDACTED]

51 [REDACTED]
52 [REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

290. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

291. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁵³ [REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

292.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

293.

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

294. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

296. [REDACTED]

[REDACTED]

[REDACTED].

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

298. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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The image consists entirely of a solid black field with no visible features, text, or patterns.

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[illegible]

████████████████████

302. [REDACTED]

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⁵⁵ Hard copies of these documents are being processed and will be produced pursuant to the Protective Order.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

C. **Qualcomm’s Cores and Qualcomm’s Product Designs do not** [REDACTED]
[REDACTED]

304. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Colwell Report ¶ 113. I disagree. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

305. The necessity to develop market-specific applications for a microprocessor’s commercial success cannot be overstated. [REDACTED]

[REDACTED]

[REDACTED]

These sectors, each with their unique requirements and constraints, demand tailored design approaches that are fundamentally independent of the underlying architecture. For instance, server applications prioritize performance and scalability, mobile applications focus on energy efficiency and compactness, compute-intensive applications demand high computational power and efficiency, and automotive applications require robustness and safety compliance. This segregation leads to significant design choices in microarchitecture, influencing aspects such as power consumption, processing speed, physical size, and heat dissipation, ultimately shaping the technology to meet the specific needs and challenges of each market segment.

306. As an example, in this section, I will discuss certain significant microarchitectural differences between Qualcomm’s Product Designs for the [REDACTED]
[REDACTED], which reflect a strategic shift from the [REDACTED]

⁵⁶ Conversation with Gerard Williams on February 23, 2024.

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[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

308. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

134

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[illegible]

315. In addition to the significant differences necessitated by market-specific needs, Dr. Colwell and Dr. Chen do not analyze the architectural differences in the [REDACTED]

_____, which _____

316. [REDACTED]

--	--

57 [REDACTED]

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317.

[REDACTED]

[REDACTED]

[REDACTED]

318.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

VIII. QUALCOMM’S PRODUCT DESIGNS WERE IMPACTED BY THE SWAP OUT

319.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

A. [REDACTED] Were Involved in the Swap Out

320. Dr. Colwell relies on Dr. Chen’s report, in which Dr. Chen compared “[REDACTED]

[REDACTED]

[REDACTED] Chen Report ¶35. For this comparison,

Dr. Chen used the same 14 high-level RTL folders and 10 files discussed previously from

[REDACTED]. Chen Report ¶35. Dr. Chen concludes that these [REDACTED]

[REDACTED] *Id.*

321. [REDACTED]

[REDACTED] As explained in my Opening Report, all

Nuvia-sourced ARM RTL was swapped out for identical Qualcomm-sourced ARM RTL.

See Opening Report ¶¶ 73-124. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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IX. RESERVATION OF RIGHTS

322. My opinions are subject to change based on additional opinions that ARM’s experts may present and information I may receive in the future or additional work I may perform. With this in mind, based on the analysis I have conducted and for the reasons set forth above, I have reached the conclusions and opinions in this report.

323. At trial and as discussed above, I may rely on visual aids and may rely on analogies concerning any related technologies.

324. In connection with my anticipated testimony in this action, I may use as exhibits various documents produced in this case that refer or relate to the matters discussed in this report I have not yet selected the particular exhibits that might be used. In addition, I may create or assist in the creation of certain demonstrative evidence to assist me in testifying, and I reserve the right to do so.

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I certify under penalty of perjury that the foregoing is true and correct.

Date: February 27, 2024

Los Angeles, California



Murali Annavaram, Ph.D.

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

ARM LTD.,

Plaintiff,

v.

QUALCOMM INC., QUALCOMM
TECHNOLOGIES, INC. and NUVIA, INC.,

Defendants

C.A. No. 22-1146 (MN)

REBUTTAL EXPERT REPORT OF DR. MURALI ANNAVARAM

APPENDIX A
Materials Considered

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

EXHIBIT A

MATERIALS CONSIDERED

1. **Documents referenced in my Rebuttal Expert Report.**
2. **Docket (Arm Ltd. v. Qualcomm Inc. et al., No. 1-22-cv-001146 MN (D. Del.)):**

D.I. 1, Complaint, dated August 31, 2022
--

3. **Discovery Responses, witness deposition transcripts, and exhibits thereto, including:**

2023.10.12 – Gulati, Manu Deposition Transcript
2023.10.27.23 – Sharma, Nitin Deposition Transcript
2023.11.03 – Williams III, Gerard Deposition Transcript
2023.11.08 – Ashgar, Ziad Deposition Transcript
2023.11.17 – ARM’s Second Supplemental Objections & Responses to Qualcomm’s First Set of Interrogatories
2023.11.17 – Qualcomm’s Supplemental Responses & Objections to ARM’s 1st Set of ROGs (Nos. 7-12)
2023.11.29 – Bos, Lynn Deposition Transcript
2023.12.19 – Tran, Christine Deposition Transcript
2023.11.15 – Grisenthwaite, Richard Deposition Transcript
2023.10.25 – Trivedi, Jignesh Deposition Transcript
2023.12.14 – Agrawal, Vivek Deposition Transcript
2023.12.12 – Haas, Rene Deposition Transcript
2023.12.20 – Opening Expert Report of Dr. Robert Colwell (“Dr. Colwell Report”)
2023.12.20 – Opening Expert Report of Mike Chen (“Dr. Chen Report”)

4. **Produced Documents**

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<div style="background-color: black; width: 100px; height: 1.2em;"></div>

[illegible]

Dubois, et al., Parallel Computer Organization and Design (Cambridge Univ. Press, 2012)
Arm Ltd., Arm Architecture Reference Manual for A-Profile Architecture A1-38, (J.a 2023), https://documentation-service.arm.com/static/644a406baa78c007af74e6fd?token=
Dave Jagggar, Arm Architecture Reference Manual (2d ed. 2001)

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

RISC Machs. Ltd. (ARM), Arm Architecture Reference Manual, (B 1996)
Gerry Kane and Joe Heinrich, MIPS Risc Architecture (2d ed. 1991)
Andrew Waterman, et al., The RISC-V Instruction Set Manual Vol. II (2021)
ARM v8 C6.6.2.
Arm Ltd., Learn the Architecture – Introducing the Arm Architecture (2.1 2023) https://documentation-service.arm.com/static/64dcdf2a934840622b3496c9?token= (last visited February 4, 2024).
XML package can be found on the ARM Developer website under Exploration Tools at https://developer.arm.com/downloads/-/exploration-tools (last visited February 22, 2024)
Qualcomm Inc. Annual Report (Form 10-K) (Nov. 1, 2023)
Products, Qualcomm https://www.qualcomm.com/products (last visited Feb. 26, 2024).
Qualcomm, Qualcomm SDM845 / Qualcomm SDA845 SOCs at 2 (2020) https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/sdm-sda845-product_brief_87-pu778-1.pdf
Qualcomm, Qualcomm to Acquire Nuvia (Jan. 12, 2021) https://www.qualcomm.com/news/releases/2021/01/qualcomm-acquire-nuvia
Qualcomm, Qualcomm Completes Acquisition of NUVIA (Mar. 15, 2021), https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia (last visited February 27, 2024).
Steven Nellis, Nuvia, Founded by Ex-Apple Execs, Raises \$240 mln for Data Center Chips, Reuters, Sept. 24, 2020, https://www.reuters.com/article/idUSL2N2GL032/ .
Steven Nellis, Former Apple Chip Executives Found Company to Take on Intel, AMD, Reuters, Nov. 15, 2019, https://www.reuters.com/article/us-nuvia-tech/idUSKBN1XP19V/?il=0
Gerard Williams III, LinkedIn, https://www.linkedin.com/in/gerard-williams-iii-27895aa (Feb. 27, 2024).
Manu Gulati, LinkedIn, https://www.linkedin.com/in/manu-gulati-283346 (last visited Feb. 27, 2024)
John Bruno, LinkedIn, https://www.linkedin.com/in/john-brunop-eng-88616a1 (last visited Feb. 27, 2024)
Pradhan, S. (2021, November 16). Arm Cortex-X1C: scalable innovation for laptop and desktop. ARM Community Blogs Announcements. https://community.arm.com/arm-community-blogs/b/announcements/posts/arm-cortex-x1c#:~:text=Cortex%2DX1%20is%20already%20in,X1%20powered%20Google%20Tensor%20chip
Harris, D. and Harris, S., 2016. Digital Design and Computer Architecture: ARM Edition. Page 426
Arm Ltd., Arm Neoverse N1 CPU (2019), https://www.arm.com/-/media/global/products/processors/N1%20Solution%20Overview.pdf?rev=1cf46d423a6b4995809c94b14109b805&revision=1cf46d42-3a6b-4995-809c-94b14109b805
Saurabh Pradhan, <i>Arm Cortex-X1C: Scalable Innovation for Laptop and Desktop</i> , Arm Community Blogs: Announcements (Nov. 16, 2021), https://community.arm.com/arm-community-blogs/b/announcements/posts/arm-cortex-x1c

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

Arm Ltd., Arm Neoverse E1 (2019), https://www.arm.com/-/media/global/products/processors/E1%20Solution%20Overview.pdf?rev=3834164b132c4cfba1ca29329b50833f&revision=3834164b-132c-4cfb-a1ca-29329b50833f
Arm Ltd., Arm Cortex-X1 Core Technical Reference Manual (r1p2 2023), https://documentation-service.arm.com/static/64bfd6eedf6cd61d528c8a20?token=
Arm Ltd., Cortex-A65AE, ArmDeveloper, https://developer.arm.com/Processors/Cortex-A65AE (last visited Feb. 27, 2024)
Arm Ltd., Cortex-A65AE Automotive Enhanced, https://www.arm.com/-/media/global/products/processors/product_datasheet_cortex_a65ae.pdf (last visited Feb. 27, 2024).
Arm, <i>What is CPU Architecture?</i> , YouTube (Aug. 18, 2021), https://www.youtube.com/watch?v=KGHdDVLnKJM
https://en.wikipedia.org/wiki/Compute_Express_Link
Wikipedia, Intel SHA Extensions, https://en.wikipedia.org/wiki/Intel_SHA_extensions (last visited Feb. 27, 2024)
Wikipedia, Compute Express Link, https://en.wikipedia.org/wiki/Compute_Express_Link (last visited Feb. 27, 2024)
https://eprint.iacr.org/2016/444.pdf (last visited February 24, 2024)
https://dl.acm.org/doi/abs/10.1145/325096.325102 (last visited February 24, 2024).
Bhupesh Sharma, <i>Understanding 52-Bit Virtual Address Support in the Arm64 Kernel</i> , Opensource.com (Dec. 16, 2020), https://opensource.com/article/20/12/52-bit-arm64-kernel (last visited Feb. 25, 2024)
[REDACTED]
Roberto Avanzi, The QARMA Block Cipher Family, Qualcomm Product Security, https://eprint.iacr.org/2016/444.pdf (last visited February 24, 2024)
Kourosh Gharachorloo, et al., <i>Memory Consistency and Event Ordering in Scalable Shared-Memory Multiprocessors</i> , 18 ACM SIGARCH Comp. Arch. News 15 (May 1, 1990), https://dl.acm.org/doi/abs/10.1145/325096.325102 (last visited February 24, 2024)
https://www.w3schools.com/xml/simple.xml (last visited February 22, 2024)
https://github.com/alastairreid/mra_tools (last visited February 22, 2024)

6. Documents cited by Dr. Chen:

[REDACTED]
Bos Deposition Transcript dated November 29, 2023.
Stephen Nellis, Former Apple chip executives found company to take on Intel, AMD, REUTERS, https://www.reuters.com/article/us-nuvia-techidUSKBN1XP19V/?taid=5dcefd5c1dd1a30001b949f0&utm_campaign=trueAnthem%3A+Trending+Content&utm_medium=trueAnthem&utm_source=twitter (last visited December 18, 2023).
QUALCOMM, Press Release: Qualcomm to Acquire NUVIA (Jan. 21, 2021),

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

<https://www.qualcomm.com/news/releases/2021/01/qualcomm-acquire-nuvia> (last visited December 18, 2023).

QUALCOMM, Press Note: Qualcomm Completes Acquisition of NUVIA (Mar. 15, 2021), <https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia> (last visited December 18, 2023).

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7. Documents cited by Dr. Colwell:

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
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EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

[illegible]

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

ARM, https://www.arm.com/products/development-tools (last visited December 15, 2023).
ARM, Arm CPU Architecture: A Foundation for Computing Everywhere, https://www.arm.com/architecture/cpu (last visited December 15, 2023).
ARM, https://www.arm.com/products (last visited December 15, 2023).
ARM, https://www.arm.com/product-filter?families=cortex-a&showall=true (last visited December 15, 2023).
ARM, https://www.arm.com/products/silicon-ip-cpu?families=cortex-r (last visited December 15, 2023).
ARM, https://www.arm.com/products/silicon-ip-cpu?families=cortexm&showall=true (last visited December 15, 2023).
ARM, https://www.arm.com/markets/consumer-technologies (last visited December 15, 2023).
ARM, https://www.arm.com/markets/automotive (last visited December 15, 2023).
ARM, https://www.arm.com/markets/computing-infrastructure (last visited December 15, 2023).
ARM, https://www.arm.com/markets/iot (last visited December 15, 2023).
Qualcomm, Annual Report (Form 10-K) (September 26, 2021), https://www.sec.gov/Archives/edgar/data/804328/000172894921000076/qcom-20210926.htm (last visited December 15, 2023).
Introducing the Qualcomm Falkor CPU core: purpose-built for cloud workloads, QUALCOMM, OnQ Blog (Aug. 19, 2017), https://www.qualcomm.com/news/onq/2017/08/introducing-qualcomm-falkor-cpu-corepurpose-built-cloud-workloads (last visited December 15, 2023).
James Morra, With Future Uncertain, Qualcomm Loses Data Center President, ELECTRICDESIGN (May 22, 2018), https://www.electronicdesign.com/markets/automation/article/21806539/with-futureuncertain-qualcomm-loses-data-center-president (last visited December 15, 2023).
Danny Crichton, Three of Apple and Google's former star chip designers launch NUVIA with \$53M in series A funding, TECHCRUNCH (Nov. 15, 2019), https://techcrunch.com/2019/11/15/three-of-apple-and-googles-former-star-chipdesigners-launch-nuvia-with-53m-in-series-a-funding/ (last visited December 15, 2023).
Dean Takahashi, Nuvia raises \$240 million to design Arm-based CPUs for datacenters, VENTUREBEAT (Sept. 24, 2020), https://venturebeat.com/business/nuvia-raises-240-million-to-design-arm-based-cpus-for-datacenters/ (last visited December 15, 2023).
William Gayde, How Arm Came to Dominate the Mobile Market, TECHSPOT (Dec. 24, 2020), https://www.techspot.com/article/1989-arm-inside/ (last visited December 15, 2023).
APPLE, Press Release: Apple unleashes M1 (Nov. 10, 2020), https://www.apple.com/newsroom/2020/11/apple-unleashes-m1/ (last visited December 15, 2023).
Nermin Hajdarbegović, Apple M1 Processor Overview and Compatibility, TOPTAL, https://www.toptal.com/apple/apple-m1-processor-compatibility-overview (last visited December 15, 2023).
Stephen Shankland, Apple M1 Macs are kick-starting a new Arm-based PC era. Arm's

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

CEO is optimistic, CNET (Jan. 13, 2021), <https://www.cnet.com/tech/computing/appleml-macs-are-kick-starting-new-arm-based-pc-era-arm-ceo-is-optimistic/> (last visited December 15, 2023).

Urvish Mahajan, Apple M1 — How Apple Silicon Changed the PC Industry, MEDIUM (Sep. 23, 2023), <https://medium.com/@urvishmahajan/apple-m1-how-apple-changed-the-pc-industry4a7c3c8a3d57#:~:text=The%20M1%20chip%20powered%20MacBook,Window's%20growth%20was%20just%206%25> (last visited December 15, 2023).

Katie Tarasov, How Arm is gaining chip dominance with its architecture in Apple, Nvidia, AMD, Amazon, Qualcomm and more, CNBC (Nov. 9, 2023), <https://www.cnbc.com/2023/11/09/how-arm-gained-chip-dominance-with-apple-nvidiaamazon-and-qualcomm.html> (last visited December 15, 2023).

Mark Hachman, Qualcomm dubs Nuvia CPU ‘[REDACTED]’ on track for 2023, PCWORLD (Nov. 17, 2022), <https://www.pcworld.com/article/1382740/qualcomm-dubs-nuvia-on-track-for-2023.html> (last visited December 16, 2023).

QUALCOMM, Press Note: Qualcomm Unleashes Snapdragon X Elite: The AI Super-Charged Platform to Revolutionize the PC (Oct. 24, 2023), <https://www.qualcomm.com/news/releases/2023/10/qualcomm-unleashes-snapdragon-xelite--the-ai-super-charged-plat> (last visited December 16, 2023).

Hassan Mujtaba, Apple M1 ARM 8 Core CPU Is Faster Than Intel & AMD's Fastest 8 Core Chips in Single-Core Performance Benchmark, WCCFTECH (March 25, 2021), <https://wccftech.com/apple-m1-arm-8-core-cpu-faster-intel-amd-fastest-8-core-chipssingle-core-performance/> (last visited December 19, 2023).

David Coffin et al., The Roadblocks of the COVID-19 Pandemic in the U.S. Automotive Industry, U.S. INTERNATIONAL TRADE COMMISSION (USITC) (June 2022), https://www.usitc.gov/publications/332/working_papers/the_roadblocks_of_the_covid-19_pandemic_in_the_automotive_industry_final.pdf (last visited December 19, 2023).

NVIDIA and Qualcomm ARM Up Against Competitors, BERKELEY DESIGN TECHNOLOGY, INC. (October 18, 2011), <https://www.bdti.com/InsideDSP/2011/10/20/NvidiaQualcomm> (last visited December 19, 2023).

The Microprocessor Chip: Design Guidelines, Functionality, and Characteristics, CADENCE PCB SOLUTIONS (2020), <https://resources.pcb.cadence.com/blog/2020-the-microprocessor-chip-design-guidelines-functionality-and-characteristics> (last visited December 19, 2023).

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

ARM LTD.,

Plaintiff,

v.

QUALCOMM INC., QUALCOMM
TECHNOLOGIES, INC. and NUVIA, INC.,

Defendants

C.A. No. 22-1146 (MN)

REBUTTAL EXPERT REPORT OF DR. MURALI ANNAVARAM

APPENDIX B
Source Code

Appendix B contains the following documents, which have been designated as “HIGHLY CONFIDENTIAL - SOURCE CODE - ATTORNEYS’ EYES ONLY” pursuant to the Protective Order in this action.



Pursuant to the Protective Order, a printed copy of the above-listed documents is being sent via FedEx to the offices:

Morrison & Foerster LLP
2100 L Street, NW
Suite 900
Washington, D.C., 20037
Phone: (202) 887-1500

Exhibit 8

**United States District Court
District of Delaware
Civil Action No. 01:22-cv-01146-MN**

Arm Ltd.

v.

**Qualcomm Inc.,
Qualcomm Technologies, Inc., and
NuVia, Inc.**

**Expert Report of Patrick F. Kennedy, Ph.D.
February 27, 2024**

ARM LTD. V. QUALCOMM INC., QUALCOMM TECHNOLOGIES, INC., AND NUVIA, INC.**TABLE OF CONTENTS**

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ARM LTD. V. QUALCOMM INC., QUALCOMM TECHNOLOGIES, INC., AND NUVIA, INC.

I. INTRODUCTION

1. I have been retained by Counsel representing Qualcomm Inc., Qualcomm Technologies, Inc. (both Qualcomm entities are referred to in this report as “Qualcomm”), and NuVia, Inc. (“Nuvia”) (collectively referred to as the “Defendants” or “Counter-Plaintiffs”) to evaluate the claims asserted by Arm Ltd. (“Arm”) for the alleged wrongful conduct described in Arm’s complaint in this action.¹ The purpose of my report is to disclose my professional background and experience, the materials subject to my review, and my expert opinions associated with Arm’s claims regarding damages in this matter. Specifically, this report provides my rebuttal opinions to the expert report of Arm’s retained damages expert, W. Todd Schoettelkotte, dated December 20, 2023 (the “Schoettelkotte Report”), as well as my rebuttal to certain opinions offered by Arm’s retained contract expert, Guhan Subramanian, in his report dated December 20, 2023 (the “Subramanian Report”).

2. This report summarizes my opinions given the information available to me at this time. If I receive additional relevant information, I reserve the right to prepare a supplement report incorporating this new information.

II. QUALIFICATIONS AND TESTIMONY

3. I am an economist and Managing Director with Stout Risius Ross, LLC (“Stout”). Stout is a professional services firm that provides independent expert testimony, analysis, valuation, and strategic consulting services to clients, along with financial services such as investment banking, advisory, and valuation services. I hold a bachelor’s degree in Economics from the University of California, San Diego and a doctorate in Economics from Stanford

¹ Complaint, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.*, Civil Action No. 1:22-cv-01146-MN, August 31, 2022 (“Complaint”), pp. 1-2.

ARM LTD. V. QUALCOMM INC., QUALCOMM TECHNOLOGIES, INC., AND NuVIA, INC.

University. Prior to joining Stout, I was a Managing Director with Torrey Partners, a Managing Director with LECG, a Shareholder with Mack|Barclay, Inc., a Director of Economic Research with International Securities Group, and an Economist with the Board of Governors of the Federal Reserve System in Washington, D.C. Attached at **Exhibit A** is my curriculum vitae, which summarizes my educational and professional background.

4. My professional experience includes assessing economic damages within and outside of the litigation environment; many of these matters have required my presentation of qualified expert testimony in state and federal courts. Attached at **Exhibit B** is a list of my deposition, arbitration, and trial testimony for the last five years.

5. In this case, Stout is being compensated for my analysis and testimony at a rate of \$850 per hour. In preparing the analysis reflected in this report, I have been assisted by consultants employed by Stout, who performed work under my direction. My compensation is not contingent upon the outcome of this litigation or my opinions.

III. MATERIALS CONSIDERED

6. In connection with my continuing review and analysis, I have considered, reviewed, and relied upon materials and information that may be cited directly in this report and are generally summarized at the attached **Exhibit C**. This information includes pleadings, depositions, documents produced by the parties, third party information, relevant case law, interviews, and other expert reports, all of which I incorporate herein by reference, even if not specifically stated.

ARM LTD. V. QUALCOMM INC., QUALCOMM TECHNOLOGIES, INC., AND NUVIA, INC.

IV. CASE BACKGROUND**A. Relevant Parties****i. Arm Ltd.**

7. Arm was incorporated in 1990 and is headquartered in Cambridge, United Kingdom.² Arm is a licensing company.³ It has had over 1,000 licenses during its time in business.⁴ It develops and licenses central processing unit (“CPU” or “microprocessor”⁵) and architecture technologies for use in semiconductors and products such as “cloud compute, networking equipment, automotive and consumer electronics” (e.g., smartphones, laptops).⁶ Arm states that its “primary product offerings are leading CPU products that address diverse performance, power, and cost requirements. Complementary products such as graphic processing units (“GPUs”), System IP, and compute platforms are also available and enable high-performance, efficient, reliable, system-level creation for a wide range of increasingly sophisticated devices and applications.”⁷ In its fiscal year ending March 31, 2023, Arm generated \$2.0 billion revenue from external customers (comprised of \$569 million in license and other revenue and \$1.5 billion in royalty revenue) and \$0.7 billion in revenue from related parties, for \$2.7 billion in total revenue.⁸

² Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, pp. 2-3, 83. Arm Holdings Limited is a wholly owned subsidiary of Arm Limited.

³ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, pp. 87, 91.

⁴ Arm Ltd.’s Second Supplemental Objections and Responses to Qualcomm’s First Set of Interrogatories (Nos. 1-11), November 17, 2023, p. 77.

⁵ <https://download.intel.com/newsroom/kits/40thanniversary/pdfs/What_is_a_Microprocessor.pdf>.

⁶ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, pp. 86-87.

⁷ Arm Holdings plc Form 424(b)(4), September 14, 2023, p. 2.

⁸ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 105.

ARM LTD. V. QUALCOMM INC., QUALCOMM TECHNOLOGIES, INC., AND NUVIA, INC.

ii. Qualcomm

8. Qualcomm was incorporated in 1985 and is headquartered in San Diego, California.⁹ Qualcomm is a global leader in the development and commercialization of technologies for the wireless telecommunications (e.g., 3G, 4G, and 5G wireless connectivity) and “high performance and low-power computing including on-device artificial intelligence” markets.¹⁰ Beyond these markets, Qualcomm also provides technologies to markets such as automotive (e.g., connectivity, digital cockpit, advanced driver assistance systems, and automated driving) and internet of things (“IoT”), (e.g., consumer computing, voice and music, extended reality, edge networking, and industrial).¹¹ Qualcomm generated \$35.8 billion in total revenue in the fiscal year ending September 2023, comprised of \$30.0 billion from the sale of equipment and services and \$5.8 billion in licensing revenue.¹² According to Arm, Qualcomm represented approximately 11% of Arm’s total revenue in its fiscal year ending March 31, 2023.¹³

iii. Nuvia

9. Nuvia was founded in 2019 by Gerard Williams III, Manu Gulati, and John Bruno, who had previously worked at other technology companies such as Apple Inc. and Google.¹⁴ Nuvia was a start-up company that focused on designing and developing semiconductor technologies for server and networking markets.¹⁵ In October 2019, Nuvia obtained its first outside funding of \$4 million from Mayfield Fund LLC.¹⁶ In November 2019, Nuvia raised \$53

⁹ Qualcomm Incorporated, Form 10-K for fiscal year ended September 24, 2023, pp. 6, 27.

¹⁰ Qualcomm Incorporated, Form 10-K for fiscal year ended September 24, 2023, p. 6.

¹¹ Qualcomm Incorporated, Form 10-K for fiscal year ended September 24, 2023, p. 6.

¹² Qualcomm Incorporated, Form 10-K for fiscal year ended September 24, 2023, pp. 41, 43.

¹³ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 45; 11% times \$2.7 billion equals \$297 million.

¹⁴ <<https://9to5mac.com/2019/11/15/three-former-apple-execs-create-new-chip-company-will-compete-with-intel-and-amd/>>.

¹⁵ <<https://www.globenewswire.com/news-release/2019/11/15/1948072/0/en/NUVIA-Raises-53-Million-to-Reimagine-Silicon-Design-for-the-Data-Center.html>>.

¹⁶ S&P Capital IQ, Nuvia, Inc. Transaction Details, Private Placement: Mayfield Fund, LLC.

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million in a Series A round¹⁷ and in September 2020, Nuvia raised \$240 million in a Series B round.¹⁸ In January 2021, Qualcomm announced the acquisition of Nuvia for approximately \$1.4 billion,¹⁹ and on March 16, 2021, Qualcomm completed the acquisition of Nuvia.²⁰

B. Litigation

10. On August 31, 2022, Arm filed a complaint against Qualcomm and Nuvia for breach of contract – specific performance, declaratory judgment and trademark infringement under 15 U.S.C § 114, and declaratory judgment and false designation under 15 U.S.C § 1125 in the District of Delaware.²¹

11. On September 30, 2022, Defendants submitted a counterclaim against Arm for declaratory judgment that (a) Qualcomm and Nuvia did not breach the Nuvia Architecture License Agreement (“ALA”) and Technology License Agreement (“TLA”), (b) post-Nuvia acquisition, Qualcomm’s cores and products with Nuvia technology are licensed under the Qualcomm ALA and TLA, (c) Arm’s statements that Qualcomm’s ALA expires in 2024 are false, (d) Arm’s statements that Qualcomm cannot deliver Arm-compliant products after 2024 are false, and (e) Arm has no right to prevent Qualcomm from shipping its validly-licensed products.²² Defendants also requested the Court to enjoin Arm from (a) making claims that Qualcomm’s products are not licensed under the Qualcomm-Arm agreements, that Qualcomm’s products are not Arm-compatible, that Qualcomm’s products cannot be commercialized as Arm-compliant, or that

¹⁷ <<https://www.globenewswire.com/news-release/2019/11/15/1948072/0/en/NUVIA-Raises-53-Million-to-Reimagine-Silicon-Design-for-the-Data-Center.html>>.

¹⁸ <<https://techcrunch.com/2020/09/24/nuvia-series-b/>>.

¹⁹ <<https://www.qualcomm.com/news/releases/2021/01/qualcomm-acquire-nuvia>>.

²⁰ <<https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia>>. S&P Capital IQ, Nuvia, Inc. Transaction Details, Merger/Acquisition: Qualcomm Technologies, Inc. Complaint, August 31, 2022.

²² Defendants’ Answer and Defenses to Plaintiff’s Complaint and Jury Demand and Defendants’ Amended Counterclaim, September 30, 2022, p. 80.

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Qualcomm is prohibited from using Arm's marks in marketing of such products, (b) misrepresenting the terms in the Arm / Qualcomm agreements, and (c) making false statements about Qualcomm's ability to sell its CPU products to customers and others.²³

C. Industry Background

i. CPUs

12. A CPU is a hardware component that acts as the "brain of any computing device."²⁴ CPUs work "with other hardware components and software programs to process data and manage the flow of information within electronic devices."²⁵ "A CPU core is a single processing unit within the CPU that can execute instructions."²⁶ A System-on-a-Chip ("SoC") integrates CPUs and other components such as a graphics processor, memory, and power management circuits, into a single silicon chip.²⁷ Being able to have multiple cores on a single SoC can allow them to use less power and take up less space than their multi-chip counterparts, and are thus becoming increasingly popular with the growth of areas such as IoT.²⁸

13. A CPU is designed to be compatible with an instruction set architecture ("ISA"), which "define[s] the operations that the processor can perform, such as arithmetic" or "logical operations."²⁹ The ISA acts as an interface between the hardware and software, allowing programmers to write code that can be executed by the processor.³⁰ By adhering to a specific

²³ Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Amended Counterclaim, September 30, 2022, p. 81.

²⁴ <<https://www.arm.com/glossary/cpu>>; <<https://aws.amazon.com/what-is/cpu/>>.

²⁵ <<https://www.arm.com/glossary/cpu>>; <<https://aws.amazon.com/what-is/cpu/>>.

²⁶ <<https://www.lenovo.com/us/en/glossary/cpu-core/>>.

²⁷ <<https://www.arm.com/glossary/soc-development>>; <<https://www.intel.com/content/www/us/en/support/articles/000056236/intel-nuc.html>>.

²⁸ <<https://www.telink-semi.com/system-on-chip/>>. The "Internet of Things" describes physical objects embedded with sensors that communicate with computing systems via wired or wireless networks. See <<https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-the-internet-of-things>>.

²⁹ <<https://www.lenovo.com/us/en/glossary/instruction-set-architecture/>>.

³⁰ <<https://www.lenovo.com/us/en/glossary/instruction-set-architecture/>>.

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ISA, software can be written once and executed on various hardware platforms, enhancing compatibility and portability.³¹

ii. Market Segments

14. CPUs are created for various market segments to meet the specific computing needs of those segments.³² The PC market uses the CPU as “its brain, telling other components what to do.”³³ The types of CPUs used in PCs vary “from ones that are great for everyday use to ones that give you more processing power for heavy-duty tasks.”³⁴ The mobile market utilizes processors that are responsible for “the speed, efficiency and battery life for [] smartphone[s].”³⁵ Mobile CPUs have the ability to power machine learning capabilities in mobile phones, and continuous improvements in mobile CPU technology will allow “everything from...games to background tasks [to] run that little bit faster” while “consuming less power” and “prolonging...battery life.”³⁶ Consumer electronics such as tablets, “household appliances, heating and cooling systems, [and] health and fitness monitors” also utilize CPUs.³⁷ Consumer electronics also show how CPUs can be used as a part of IoT, which can range from simple “smart home” devices that automate processes and control devices, such as sensors and refrigerators to machines³⁸ or applications that are used in industrial or medical industries.³⁹

³¹ <<https://www.lenovo.com/us/en/glossary/instruction-set-architecture/>>.

³² <<https://www.qualcomm.com/products/technology/processors>>.

³³ <<https://support.microsoft.com/en-us/windows/common-pc-and-device-terms-4542f069-4cf7-431a-bb6b-c6cbdbe3e6e9>>

³⁴ <<https://support.microsoft.com/en-us/windows/common-pc-and-device-terms-4542f069-4cf7-431a-bb6b-c6cbdbe3e6e9>>

³⁵ <<https://www.qualcomm.com/news/onq/2013/06/mobile-processors-101-why-smartphones-are-smarter-all-one-processor>>; <<https://www.qualcomm.com/products/technology/processors>>; <<https://aws.amazon.com/what-is/cpu/>>.

³⁶ <<https://www.androidauthority.com/mobile-processors-2022-2741344/>>.

³⁷ <<https://www.arm.com/glossary/connected-devices>>.

³⁸ <<https://www.arm.com/glossary/smart-devices>>.

³⁹ <<https://www.arm.com/glossary/iot-devices>>.

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15. The automotive market incorporates CPUs in the form of Advanced Driver Assistance Systems (“ADAS”) by using “multiple data inputs from a variety of cameras, radar and other sensors to detect and warn drivers of unsafe situations.”⁴⁰ Some specific ADAS technologies include autonomous emergency braking, adaptive cruise control, driver alerts, and blind spot detection.⁴¹

16. CPUs are also used in computer servers and are designed to “execute calculations and tasks at a far more complex and robust level compared to PC processors.”⁴² Server CPUs are designed to handle heavier workloads such as file sharing for an office or remote workers and customers all over the world, telecommunications services that process network traffic routing for millions of connected devices, or control of multiple devices on a factory line, from conveyor belts to robotic arms and cameras.⁴³ Overall, server CPUs typically have more cores and support for various features due to their design for use in “high-performance computing environments” such as data centers.⁴⁴

17. The table below shows Arm’s market share in various market segments between 2020 and 2022.

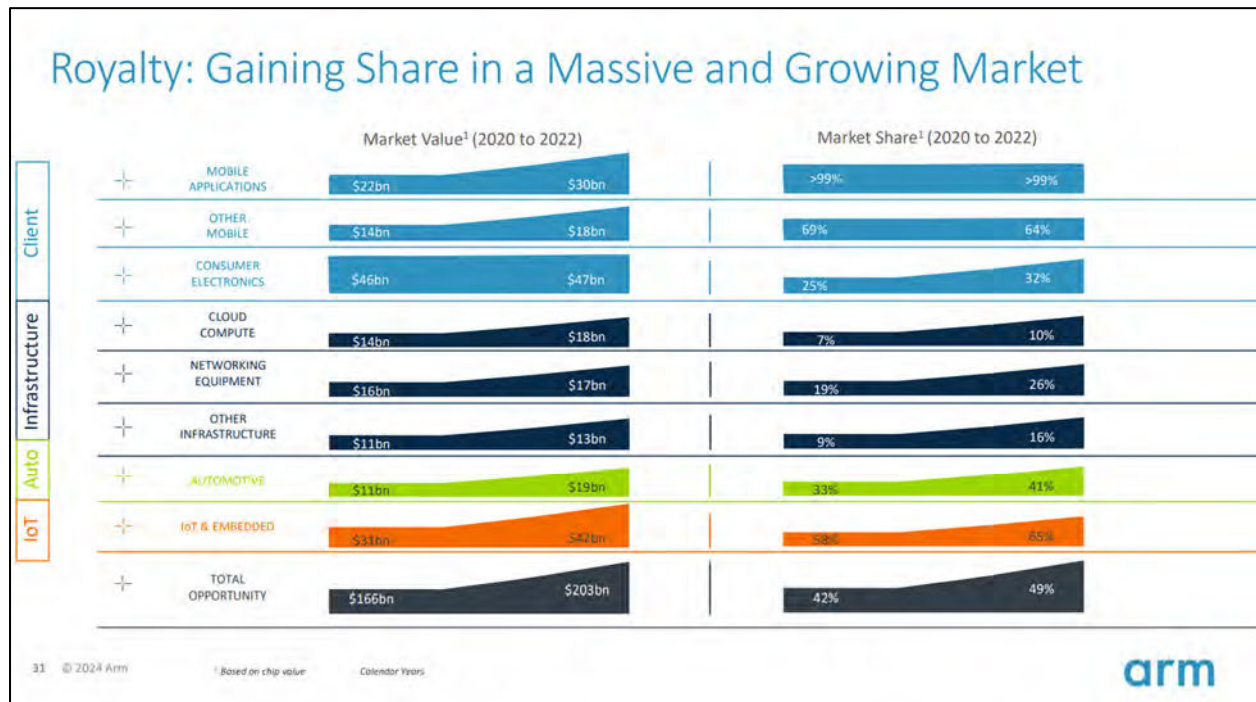
⁴⁰ <<https://www.arm.com/glossary/adas>>.

⁴¹ <<https://www.arm.com/glossary/adas>>.

⁴² <<https://www.intel.com/content/www/us/en/products/docs/processors/xeon/server-processor-overview.html>>.

⁴³ <<https://www.intel.com/content/www/us/en/products/docs/processors/xeon/server-processor-overview.html>>.

⁴⁴ <<https://www.lenovo.com/us/en/glossary/cpu-core/>>.

ARM LTD. V. QUALCOMM INC., QUALCOMM TECHNOLOGIES, INC., AND NUVIA, INC.**Figure 1: Arm CPU Market Share by Segment, 2020-2022⁴⁵****D. Arm's Licensing Programs**

18. I understand that Arm licenses its technology and architecture under agreements including architecture licensee agreements ("ALA") and technology license agreements ("TLA"). Arm states that [REDACTED]

[REDACTED]

[REDACTED]⁴⁶

19. [REDACTED]

[REDACTED] In addition to an

⁴⁵ <<https://investors.arm.com/static-files/187d293b-42eb-48b0-b82f-e78bce4da9e4>>. According to Arm, aside from licensing CPU IP, it also licenses GPU IP, ISP IP, and System IP. ARM_01239789-40096 at '857-'859.

⁴⁶ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 87.

⁴⁷ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 87.

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[REDACTED]

[REDACTED]⁴⁸ Arm states in its filings with the U.S. Securities and Exchange Commission (“SEC”) that it [REDACTED]

[REDACTED]

[REDACTED]

20. Under a TLA, [REDACTED]

[REDACTED]⁵⁰ Arm describes that the “[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].”⁵¹ In its Form F-1⁵² filed September 5, 2023, Arm states that [REDACTED]

[REDACTED]

[REDACTED]

i. Arm / Nuvia Agreements⁵⁴

21. On September 26, 2019, Arm and Nuvia entered into a TLA [REDACTED]

[REDACTED]

[REDACTED].⁵⁵ Under the Arm / Nuvia TLA, [REDACTED]

⁴⁸ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 133.

⁴⁹ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 133.

⁵⁰ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 87. *See, e.g.*, QCARM_0275743-763 at ‘761-‘762.

⁵¹ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, pp. 132-133.

⁵² A Form F-1 is a “basic registration form under the [1933] Securities Act for Foreign private issuers” that has various financial statement requirements. *See* <https://viewpoint.pwc.com/dt/us/en/pwc/pwc_sec_volume/pwc_sec_volume_US/8000_registration_a_n_US/sec_8110_form_f1_US.html#pwc-topic.dita_fb3ce65d-0b9d-4db7-92ff-4e1fd99ba885>.

⁵³ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, pp. 87, 132.

⁵⁴ I do not provide any legal opinions regarding these agreements or the terms contained in these agreements. This section summarizes relevant terms for background purposes only.

⁵⁵ QCARM_0338297-311 at ‘298-‘299, ‘301; QCARM_0275743-763 at ‘743-‘744.

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[REDACTED]

[REDACTED].⁵⁶ [REDACTED]

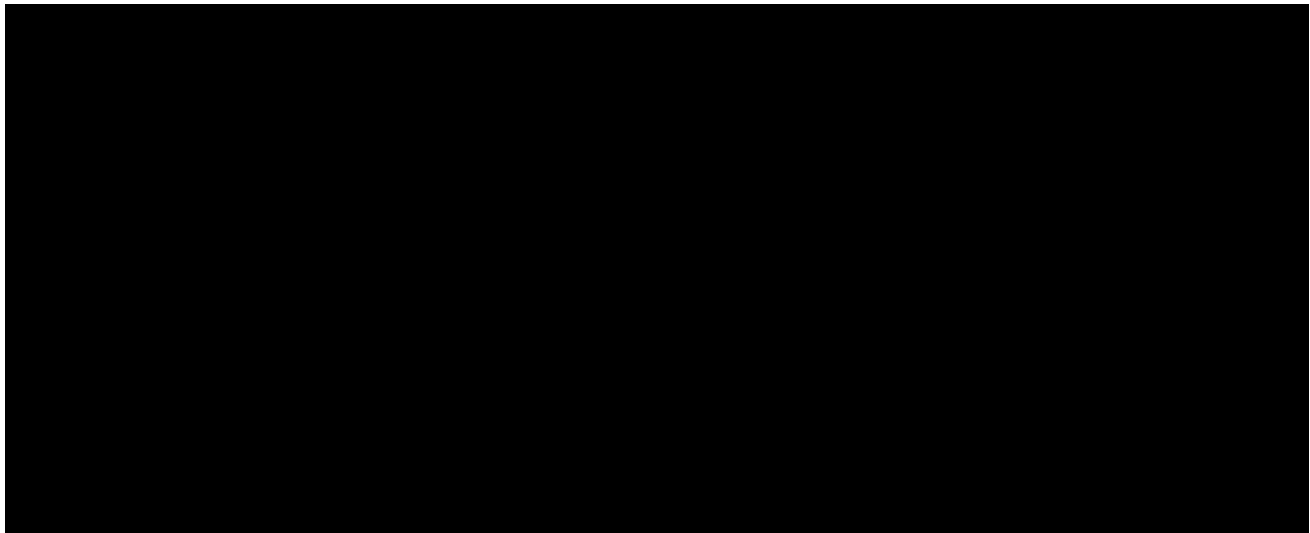
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Figure 2: Royalty Rates per Arm / Nuvia TLA



22. On September 27, 2019, Arm and Nuvia entered into an ALA [REDACTED]

a [REDACTED]

[REDACTED]

[REDACTED]

⁵⁶ QCARM_0338297-311 at '298-'299; QCARM_0275743-763 at '743-'744.

⁵⁷ QCARM_0275743-763 at '743-'744, '760-'761.

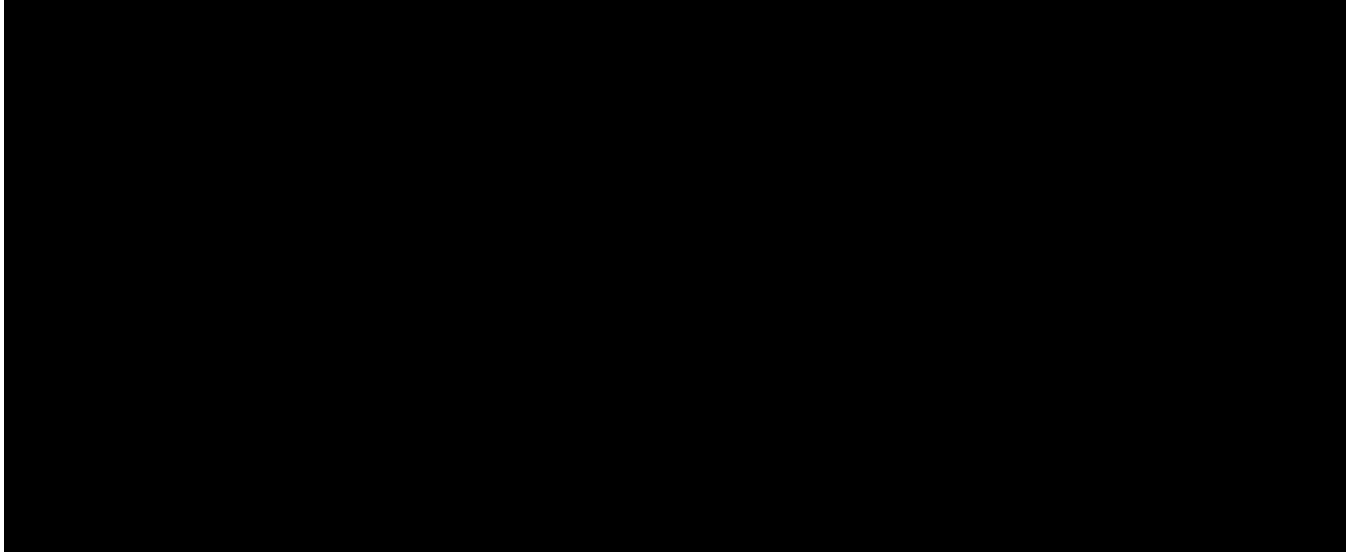
⁵⁸ QCARM_0275743-763 at '761-'762.

⁵⁹ QCARM_0337839-855; QCARM_3839896-911 at '906.

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[REDACTED] In addition, [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Figure 3: Royalty Rates per Arm / Nuvia ALA⁶³



23. In total, under the Arm / Nuvia TLA and Arm / Nuvia ALA, [REDACTED]

[REDACTED].⁶⁴

⁶⁰ According to the testimony of Tim Herbert, former Vice President of North American Sales at Arm, "RATL" is a limited form of Raven, which is a piece of software that Arm licenses to ALA customers for verifying designs. See Deposition of Tim Herbert, October 25, 2023, pp. 15-16, 208.

⁶¹ QCARM_3839896-911 at '902, '908.

⁶² QCARM_3839896-911 at '908.

⁶³ QCARM_3839896-911 at '908.

⁶⁴ [REDACTED]
[REDACTED]
[REDACTED]

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24. I understand that Arm and Nuvia revised the Arm / Nuvia TLA and Arm / Nuvia ALA in March 2020.⁶⁵ [REDACTED]

ii. Arm / Qualcomm Agreements

25. On May 30, 2013, Arm and Qualcomm entered into a TLA, which superseded the parties' original TLA from September 30, 1997, whereby [REDACTED]

[REDACTED]⁶⁷

26. On May 31, 2013, Arm and Qualcomm entered into an Amended and Restated ALA (the "Arm / Qualcomm ALA" or "Qualcomm ALA"), which superseded the parties' original ALA entered into in September 2003.⁶⁸ As part of the Arm / Qualcomm ALA, [REDACTED]

[REDACTED] Per the Arm / Qualcomm ALA Annexes for the v8-A and v8-A Next architectures, [REDACTED]

[REDACTED] Effective June 23, 2020, Arm and Qualcomm entered into another Annex 1 to the Arm / Qualcomm ALA, which superseded the Annex 1 for v8-A Next architecture and granted Qualcomm a license to Arm's v9-A architecture.⁷² Throughout my report, I refer to Arm's v8-A architecture as "v8" and Arm's v9-A architecture as "v9."

⁶⁵ ARM_01232495-512; ARM_00058159-163.

⁶⁶ ARM_01232495-512 at '500.

⁶⁷ QCARM_0343533-587 at '533.

⁶⁸ QCARM_0337857-899 at '857.

⁶⁹ See ARM_01292867-914 at '878.

⁷⁰ QCARM_0337857-899 at '857, '860, '863; QCARM_0343120-142; QCARM_0338573-576; QCARM_0343954-976.

⁷¹ QCARM_0343120-142 at '139; QCARM_0338573-576 at '576.

⁷² QCARM_0343954-976 at '958.

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27. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED] As of

Qualcomm's acquisition of Nuvia, I understand that Qualcomm had active ALA licenses to Arm's v8 and v9 architectures.⁷⁵

V. SUMMARY OF THE SCHOETTELKOTTE REPORT

28. Mr. Schoettelkotte issued an expert report on December 20, 2023, in which he opines that "if Defendants are found liable for breach of the Nuvia ALA but are not ordered to discontinue the use and distribution of [REDACTED], then monetary damages are not adequate to compensate Arm for the harm (including future harm) caused by Defendants' breach of the Nuvia ALA" and that monetary damages cannot be determined with "reasonable certainty."⁷⁶ Mr. Schoettelkotte did not provide a monetary estimate for these asserted damages.

29. Mr. Schoettelkotte claims, relying primarily on the testimony of and discussions with Arm personnel, that the following harms to Arm "may" result from Defendants' breach of the Nuvia ALA:⁷⁷

⁷³ See, e.g., QCARM_3474751-828 at '773-'774.

⁷⁴ See, e.g., QCARM_3474751-828 at '774-'775.

⁷⁵ ARM_00079507-514 at '508-'509.

⁷⁶ Schoettelkotte Report, p. 6.

⁷⁷ Schoettelkotte Report, p. 6.

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- Disruption to Arm's ability to control the use and distribution of Arm's intellectual property [REDACTED] and to maintain Arm's licensing ecosystem;
- Significant negative impact on Arm's first mover advantage;
- Harm to Arm's expansion into new segments and markets;
- A decrease in licensing revenue and investment in research and development; and
- A decrease in Arm's reputation and goodwill.

30. Mr. Schoettelkotte further opines that, related to Arm's claimed potential harms to its licensing ecosystem, "Defendants' breach of the ALA could have a cascade of significant effects" including:⁷⁸

- Existing and prospective Arm licensees could demand more favorable terms and lower royalties to account for increased risk;
- Existing and prospective licensees could exploit development and financial terms of other licensees in unexpected ways to compete against Arm's partners;
- Arm will not be able to rely on provisions in its existing and prospective licenses to protect its intellectual property [REDACTED];
- Third parties and end users may shift to Nuvia-based Cores;⁷⁹ and
- Existing and prospective licensees may shift away from Arm chips.

⁷⁸ Schoettelkotte Report, p. 7.

⁷⁹ Mr. Schoettelkotte defines "Nuvia-based Cores" as [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] See Schoettelkotte Report, p. 30.

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31. Finally, Mr. Schoettelkotte opines that certain factors “exacerbate the difficulty of determining the monetary damages” due to his claimed potential harms, including the fact that Qualcomm is a large and long-time customer of Arm’s, the relative speed at which the semiconductor industry develops, and “acute uncertainty of the harms given the actions of current and prospective licensees, and unknown emerging market segments, among other uncertainties.”⁸⁰

32. I address each of Mr. Schoettelkotte’s opinions in the following sections.⁸¹

VI. REBUTTAL OPINIONS REGARDING THE SCHOETTELKOTTE REPORT

A. Introduction

33. As a threshold matter, although Mr. Schoettelkotte identified several purported potential harms that Defendants’ alleged wrongful conduct in this matter has allegedly caused Arm, there is a lack of evidence of actual harm or the prospective future harm to Arm of the kind that Mr. Schoettelkotte identifies. For example, Arm’s public statements to investors and the SEC emphasize Arm’s increased revenues, profits, and strength of its licensing ecosystem, which contradict the presence of the purported past or prospective future harms identified by Mr. Schoettelkotte. Further, Arm’s deponents did not identify any actual harm suffered as a result of Defendants’ alleged wrongful conduct. To the contrary, Qualcomm’s development of custom

⁸⁰ Schoettelkotte Report, p. 7.

⁸¹ Mr. Schoettelkotte has represented that he and Arm are not aware of any trademark infringements by Defendants to date. See Schoettelkotte Report, p. 67. Mr. Schoettelkotte has also not identified any damages related to trademark infringement in his report. However, Mr. Schoettelkotte states that he “may be asked to opine on potential damages associated with trademark infringement if any such infringement is alleged to have occurred before trial of this matter” and that he “reserve[s] [his] right to do so.” See Schoettelkotte Report, p. 67. I reserve the right to rebut or respond to Mr. Schoettelkotte’s damages opinions related to Defendants’ alleged trademark infringement should Mr. Schoettelkotte put forth such opinions.

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CPUs should benefit Arm by contributing to the expansion of Arm-compliant products into new segments and markets at the expense of non-Arm competition, as discussed in more detail below.

34. In any event, contrary to Mr. Schoettelkotte's opinions, assuming a liability finding in favor of Arm, Arm's damages are readily quantifiable with reasonable certainty, and such damages are adequate to compensate for Arm's alleged harm if Arm is successful in proving its claims.

35. Mr. Schoettelkotte fails to acknowledge that Arm quantified the compensation that it sought in connection with the events underlying this lawsuit. As described below, at the time Nuvia and Arm negotiated the Nuvia agreements, Arm quantified the amount it expected to earn from Nuvia over the term of the agreements.⁸² Then, after Qualcomm announced the acquisition of Nuvia, Arm internally calculated the amount that it sought from Qualcomm as part of the acquisition and engaged in commercial negotiations with Qualcomm whereby Arm sought payment from Qualcomm.⁸³ [REDACTED]

[REDACTED]⁸⁴ As a part of the negotiations with Qualcomm, [REDACTED]
[REDACTED]⁸⁵ Arm did not seek additional compensation for the types of harm that Mr. Schoettelkotte claims to have occurred or may occur in the future. Therefore, damages are not only quantifiable, but Arm itself has quantified the amount of compensation it seeks.

36. Further, I understand that, in the past, various Arm licensees have been acquired, and [REDACTED] [REDACTED]

⁸² ARM_01294035-036 at '036.

⁸³ ARM_00079507-514 at '509; see Section VI.E.iii. below for discussion of Arm's proposals sent to Qualcomm.

⁸⁴ ARM_00079507-514 at '509-'512.

⁸⁵ ARM_00079507-514 at '509.

⁸⁶ Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Amended Counterclaim, September 30, 2022, pp. 6-7.

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[REDACTED]

[REDACTED]

[REDACTED]

37. Mr. Schoettelkotte also ignores that there are other commonly applied damages methodologies that could be used to quantify Arm's alleged damages based on the specific claims Arm makes in this matter. For example, Arm's complaint and contemporaneous business documents indicate that Arm has taken the position that Qualcomm's alleged use of the at-issue Arm intellectual property provided Qualcomm with a head start, and this head start will cause harm to Arm. Mr. Schoettelkotte also claims that Qualcomm "gained an advantage by way of an accelerated path of developing its own CPUs" in his report.⁸⁷ Damages from an alleged head start are commonly quantified, and therefore, assuming a liability finding in favor of Arm, Arm's damages from Qualcomm's alleged head start are readily quantifiable with reasonable certainty using commonly applied damages methodology.

38. From the record, I am aware that Arm claims Qualcomm should have destroyed certain claimed intellectual property, but I am not aware of any claim by Arm that it could have prevented Qualcomm from acquiring Nuvia, or that it could have prevented Qualcomm from developing custom CPU products under Qualcomm's own ALA without any use of the purported "Nuvia-based Cores." In the but-for world, Qualcomm would enter in the market with its products containing custom-developed cores, and Arm's damages should reflect that fact. Arm's alleged damages are therefore based on timing of Qualcomm's entry into the market with its products containing its own custom-developed cores, not the presence of Qualcomm's custom cores in the market in its entirety.

⁸⁷ Schoettelkotte Report, p. 48.

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39. In general, Mr. Schoettelkotte's arguments as to why damages cannot be calculated with certainty are based on conjecture. He provides broad generalizations that unless Qualcomm is ordered to discontinue its use of Arm Confidential Information, there will be harm to Arm's licensing ecosystem, other licensees could take advantage of Arm's licensing ecosystem, Arm will not be able to expand into other markets, and there will be a negative impact on Arm's reputation and goodwill, among other things.⁸⁸ Mr. Schoettelkotte provides no factual support that any of Arm's claimed harms have happened, nor does he address the likelihood that these claimed harms would happen in the future. Mr. Schoettelkotte's bases for his opinions are primarily conversations with Arm personnel and selected citations to deposition testimony. Mr. Schoettelkotte fails to provide any independent expert analysis or foundational support for his recitation of Arm's claims, as described in detail below.

B. Mr. Schoettelkotte claims that Arm has been harmed but ignores Arm's public statements to investors and to the SEC that contradict these allegations of harm

40. Arm alleges that Defendants' actions have caused it harm, but Arm's public statements do not identify the purported harms that are the subject of Mr. Schoettelkotte's report. Mr. Schoettelkotte fails to acknowledge these public statements and nowhere addresses the fact that these statements contradict Mr. Schoettelkotte allegations of harm. Rather, Arm's public statements since the Defendants' alleged breach portray increasing royalty revenue, market share, and strength in Arm's ecosystem. These public statements of financial health and affirming the strength of Arm's licensing ecosystem—which postdate Defendants' alleged breach of the Arm / Nuvia ALA—contradict the notion that Arm has been damaged to date, and Arm has not made any public disclosure of the type and extent of the harm suggested by Mr. Schoettelkotte.

⁸⁸ Schoettelkotte Report, pp. 28, 32-33.

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41. For example, in its Form F-1 filed on September 5, 2023, Arm states that it has “long-standing, significant market share in high-value markets,” and that it believes that “the increasing need for high-powered and energy-efficient computing, as well as [Arm’s] continued investments, will enable [Arm] to grow [its] share in these segments.”⁸⁹

42. Arm also highlighted its financial performance and the strength of its licensing business in its Q2 FY 2024 shareholder letter from November 8, 2023, and stated that its “better than expected [quarterly] revenue[s] was driven by ... royalty revenue benefitting from market share gains and higher royalty rates.”⁹⁰ In the same shareholder letter, Arm states that its “better than expected revenue was driven by multiple high value long-term license agreements signed with industry leading technology companies.”⁹¹ In a September 2023 prospectus filing, Arm states that it has “entered into a new long-term agreement with Apple that extends beyond 2040, continuing our longstanding relationship of collaboration with Apple and Apple’s access to the Arm architecture.”⁹²

43. Further, since Qualcomm’s acquisition of Nuvia in March 2021, Arm’s business has not experienced a “significant disruption,” as claimed by Mr. Schoettelkotte.⁹³ For example, Arm’s licensing revenue increased from \$2.1 billion in fiscal year ending March 2021 to \$2.7 billion in fiscal year ending March 2023.⁹⁴ Arm’s profits also increased from \$388 million to \$524 million over the same period.⁹⁵ Additionally, Arm reported an increased number of products shipped

⁸⁹ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, pp. 86-87.

⁹⁰ Arm Holdings plc Q2 FY 2024 Shareholder Letter, p. 2.

⁹¹ Arm Holdings plc Q2 FY 2024 Shareholder Letter, p. 4.

⁹² Arm Holdings plc Form 424(b)(4), September 14, 2023, p. 4.

⁹³ Schoettelkotte Report, p. 32.

⁹⁴ Arm Holdings plc Q2 FY 2024 Key Financial Data, tab “KPI.”

⁹⁵ Arm Holdings plc Q2 FY 2024 Key Financial Data, tab “IS.”

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from 25.3 billion to 30.6 billion and licensees increased from 133 to 221 over the same period.⁹⁶

As of December 31, 2023, Arm's licensees had increased to 245.⁹⁷

44. Arm personnel testified that Arm prepared financial analyses for its initial public offering ("IPO"), which it completed in September 2023,⁹⁸ that projected Qualcomm revenues using Qualcomm's ALA rates, not Nuvia's ALA rates.⁹⁹ Specifically, Ian Thornton, Vice President of Investor Relations at Arm,¹⁰⁰ testified that Arm "prepared its own discounted cash flow analysis" in connection with Arm's IPO.¹⁰¹ Mr. Thornton further testified that this discounted cash flow analysis considered Qualcomm as part of its business in future years, and assumed that Qualcomm would pay royalties at Qualcomm's ALA rates.¹⁰² This is significant because Arm's IPO projections to investors, prepared for an IPO occurring two and a half years after Qualcomm's acquisition of Nuvia, represented that Arm expected Qualcomm to pay Qualcomm's ALA rates, even though Arm contends in this litigation that the designs at issue are not licensed under the Qualcomm ALA.¹⁰³

45. In addition, Arm states in its response to Qualcomm's Interrogatory No. 17 that Qualcomm's "breach of the Nuvia ALA also threatens Arm's future business plans and business model, creating risk of business losses that cannot be reasonably identified," but Mr. Thornton testified that Arm did not inform analysts, underwriters, or investors of this possible consequence

⁹⁶ Arm Holdings plc Q2 FY 2024 Key Financial Data, tab "KPI." Number of Total Access licenses were 4 in 2021 and 18 in 2023 and number of Flexible Access licenses were 129 in 2021 and 203 in 2023. 4 plus 129 equals 133 licensees in 2021 and 18 plus 203 equals 221 licensees in 2023.

⁹⁷ Arm Holdings plc Q3 FY 2024 Key Financial Data, tab "KPI." Number of Total Access licenses were 27 and number of Flexible Access licenses were 218.

⁹⁸ <<https://newsroom.arm.com/news/arm-announces-closing-of-initial-public-offering>>.

⁹⁹ Deposition of Ian Thornton, December 20, 2023, pp. 20-21, 27-28.

¹⁰⁰ Deposition of Ian Thornton, December 20, 2023, p. 7.

¹⁰¹ Deposition of Ian Thornton, December 20, 2023, p. 20.

¹⁰² Deposition of Ian Thornton, December 20, 2023, p. 31.

¹⁰³ Complaint, pp. 13-14.

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during the lead up to Arm's IPO.¹⁰⁴ When asked if Arm ever informed investors or underwriters of the possibility that the outcome of this matter could put pressure on Arm to change its customer relations and business models, Mr. Thornton testified that Arm told investors and analysts only that Arm is "confident in the outcome of [its] case and at that point the conversation moved on."¹⁰⁵ Arm did not, for example, disclose that, if it was unsuccessful in getting Qualcomm to destroy the at-issue intellectual property, its licensing ecosystem would be threatened, that it would lose its first mover advantage, that it would not be able to expand into new markets, that users would shift away from Arm products, or that Arm will not be able to rely on provisions in its existing and prospective licenses to protect its intellectual property, among the other harms that Arm discussed with Mr. Schoettelkotte.¹⁰⁶

46. Mr. Schoettelkotte claims that Arm will see a decrease in investment in research and development, but Arm also stated in public earnings calls and filings that it has increased its research and development efforts into existing technologies, like v9 processors, and into new, emerging technologies in order to meet the compute capability requirements of artificial intelligence.¹⁰⁷ Jason Child, Executive VP and CFO of Arm,¹⁰⁸ shared in Arm's Q2 FY2024 earnings call on November 8, 2023, that Arm had an increase in headcount of "about 17%" which was "about 1,000 people," and that 85% of those personnel were in research and development.¹⁰⁹ When asked in Arm's Q2 FY2024 earnings call about the effects of the "phenomenon" with "[artificial intelligence] computing" and what that means for Arm, Rene Haas, CEO of Arm,¹¹⁰

¹⁰⁴ Arm Ltd.'s First Supplemental Objections and responses to Qualcomm's Second Set of Interrogatories (Nos. 12-19), November 17, 2023, p. 35; Deposition of Ian Thornton, December 20, 2023, pp. 33-34.

¹⁰⁵ Deposition of Ian Thornton, December 20, 2023, p. 39.

¹⁰⁶ See Schoettelkotte Report, pp. 33-56.

¹⁰⁷ Schoettelkotte Report, pp. 57-61; Arm Holdings plc, FQ2 2024 Earnings Call Transcripts, November 8, 2023, pp. 4, 10; Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 9.

¹⁰⁸ Arm Holdings plc, FQ2 2024 Earnings Call Transcripts, November 8, 2023, p. 3.

¹⁰⁹ Arm Holdings plc, FQ2 2024 Earnings Call Transcripts, November 8, 2023, p. 12.

¹¹⁰ Deposition of Rene Haas, December 12, 2023, p. 11.

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stated he “think[s] broadly it’s a positive” and that the increasing artificial intelligence workloads required by CPUs and SoCs “is a tailwind for Arm” and that Arm is “pretty excited by it.”¹¹¹ In addition, in its Form F-1 from September 5, 2023, under a “Competitive Strengths” section, Arm states that it has the “[w]orld’s [m]ost [e]xtensive [e]cosystem of [t]hird-[p]arty [s]oftware and [h]ardware [p]artners” and that it estimates that it will be “investing more than 30 million hours creating the base software and tools for Armv9 processors, which will enable the next generation of apps and software for Arm-based chips.”¹¹²

47. In Arm’s shareholder letter for the quarter ending September 30, 2023, Arm reported “record revenues [] exceeding the high-end of our guidance ranges.”¹¹³ Arm stated these record revenues were “driven by both royalty revenue and license revenue” and that “Arm continues to gain market share in the growth markets of cloud servers and automotive.”¹¹⁴ Rather than report any significant disruption, Arm reported “[b]etter than expected license revenue”¹¹⁵ and signing multiple key agreements with top customers.¹¹⁶

48. Statements from Arm’s Q3 FY2024 Earnings Call Transcript also show that Arm continues to reinforce its strong licensing position to the public. For example, Mr. Haas said in his opening statements on the earnings call that Arm “had an outstanding third quarter,” “could not be more pleased,” and had “[r]ecord revenues.”¹¹⁷ Mr. Haas further stated that for Q3 FY2024, Arm is “expecting another strong quarter.”¹¹⁸ Towards the conclusion of his opening statements, Mr. Haas also stated that “[Arm] feel[s] very, very strongly positioned for growth,” and that this growth is “underpinned by an ecosystem of devices that are in the installed base and a very, very

¹¹¹ Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023, pp. 17-18.

¹¹² Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 9.

¹¹³ Arm Holdings plc Q3 FY 2024 Shareholder Letter, pp. 2-3.

¹¹⁴ Arm Holdings plc Q3 FY 2024 Shareholder Letter, p. 2.

¹¹⁵ Arm Holdings plc Q3 FY 2024 Shareholder Letter, pp. 3, 6.

¹¹⁶ Arm Holdings plc Q3 FY 2024 Shareholder Letter, p. 7.

¹¹⁷ Arm Holdings plc FQ3 2024 Earnings Call Transcripts, February 7, 2024, p. 2.

¹¹⁸ Arm Holdings plc FQ3 2024 Earnings Call Transcripts, February 7, 2024, p. 4.

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large software community that develops on Arm.”¹¹⁹ Mr. Child announced that Arm had in fact sold “additional licenses” that it had not planned for and “not anticipated.”¹²⁰

49. After the same quarter, Arm further informed investors that its revenues were the “[h]ighest ever!”¹²¹ driven by “[r]ecord royalty revenue up 11%”¹²² and “[a]nnualized contract value increase[ing] during Q3 by multiple high value, long-term ATA deals being signed.”¹²³ Arm declared that it was “continu[ing] to gain market share within the cloud compute market”¹²⁴ and had signed multiple new deals.¹²⁵

50. While Mr. Schoettelkotte opines that Arm has and will suffer irreparable harm, Arm’s statements to the public and public-facing documents contradict the type and scope of past or prospective future harm claimed by Mr. Schoettelkotte. In its public statements and filings, Arm repeatedly highlights its strong financial performance, robust licensing position, and its plans for future growth and does not mention any significant financial weaknesses.

C. Arm’s personnel have contradicted Arm’s allegations that Arm was harmed

51. Not only do Arm’s public statements indicate that Arm has not been harmed, Arm’s witnesses, including those Mr. Schoettelkotte relies on heavily in his report, testified that no actual harm has been experienced by Arm. These statements by Arm’s own personnel contradict allegations that Arm has been harmed.

52. Will Abbey, Executive Vice President and Chief Commercial Officer of Arm,¹²⁶

¹¹⁹ Arm Holdings plc FQ3 2024 Earnings Call Transcripts, February 7, 2024, p. 3.

¹²⁰ Arm Holdings plc FQ3 2024 Earnings Call Transcripts, February 7, 2024, p. 5.

¹²¹ Arm Holdings plc FQ3 2024 Results Presentation February 7, 2024, Slide 6.

¹²² Arm Holdings plc FQ3 2024 Results Presentation February 7, 2024, Slide 7.

¹²³ Arm Holdings plc FQ3 2024 Results Presentation February 7, 2024, Slide 8.

¹²⁴ Arm Holdings plc FQ3 2024 Results Presentation February 7, 2024, Slide 20, 21.

¹²⁵ Arm Holdings plc FQ3 2024 Results Presentation February 7, 2024, Slide 13, 34.

¹²⁶ Deposition of Will Abbey, October 27, 2023, p. 69.

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[REDACTED]

Mr. Abbey further testified that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Additionally, Mr. Abbey testified that "[REDACTED]"

[REDACTED]

[REDACTED] but when asked [REDACTED]

[REDACTED]

[REDACTED]

53. Paul Williamson, Senior Vice President and General Manager of Internet of Things at Arm,¹³⁰ testified that [REDACTED]

[REDACTED] However, when asked if [REDACTED]

[REDACTED]

[REDACTED] Mr. Williamson testified that he is [REDACTED]

[REDACTED] Similarly, when asked if he is aware of [REDACTED]

[REDACTED] Mr. Williamson testified

that he is [REDACTED]

[REDACTED] Mr. Williamson also testified that [REDACTED]

[REDACTED]

[REDACTED]

¹²⁷ Deposition of Will Abbey, October 27, 2023, pp. 364-365.

¹²⁸ Deposition of Will Abbey, October 27, 2023, pp. 366-367.

¹²⁹ Deposition of Will Abbey, October 27, 2023, pp. 365-366.

¹³⁰ Deposition of Paul Williamson, November 9, 2023, p. 10.

¹³¹ Deposition of Paul Williamson, November 9, 2023, p. 245.

¹³² Deposition of Paul Williamson, November 9, 2023, p. 244.

¹³³ Deposition of Paul Williamson, November 9, 2023, pp. 245-246.

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However, [REDACTED]

[REDACTED] Mr. Williamson testified that he is [REDACTED]

[REDACTED] In addition, when asked if [REDACTED]

[REDACTED] Mr. Williamson testified that he is [REDACTED]

[REDACTED] Mr. Williamson further testified [REDACTED]

[REDACTED] he does not [REDACTED]

54. Mr. Haas also testified that [REDACTED]

[REDACTED]⁸ Further, [REDACTED]

[REDACTED] Mr. Haas testified [REDACTED]

55. It is telling that senior executives at Arm are unable to identify any actual harm or damages experienced by Arm. The testimony of these deponents provides additional evidence that Arm has not suffered any harm or damages as a result of the Defendants' alleged breach.

D. Mr. Schoettelkotte ignores that Qualcomm's development of the [REDACTED] Cores benefits Arm

56. While Arm alleges that the Defendants' alleged breach has caused harm, Qualcomm's development efforts and business plans related to the development of custom Arm-compliant CPUs in certain markets will actually benefit Arm. Specifically, Qualcomm's development efforts of its Arm-compatible [REDACTED]TM CPU cores (the "[REDACTED] Cores") will likely lead to increased royalties for Arm. Mr. Schoettelkotte ignores this in his report.

¹³⁴ Deposition of Paul Williamson, November 9, 2023, p. 246.

¹³⁵ Deposition of Paul Williamson, November 9, 2023, p. 246.

¹³⁶ Deposition of Paul Williamson, November 9, 2023, p. 247.

¹³⁷ Deposition of Paul Williamson, November 9, 2023, pp. 248-249.

¹³⁸ Deposition of Rene Haas, December 12, 2023, pp. 164-165.

¹³⁹ Deposition of Rene Haas, December 12, 2023, pp. 165-166.

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57. Historically, Arm-based processors have not captured a large share of the PC market. Between Q1 2022 and Q3 2023, Arm-based processors captured between 9.4% and 14.8% of the PC market based on unit volume, according to Mercury Research, whereas the large majority of the PC market has been captured by x86 processors sold by companies such as Intel and AMD.¹⁴⁰ Further, a majority of Arm-based processors in the PC market are used in Apple desktops and laptops, as opposed to Windows-based PCs,¹⁴¹ which “limit[s] [Arm’s] growth as Microsoft’s Windows is the world’s most popular operating system.”¹⁴² [REDACTED]

58. At Qualcomm’s Snapdragon¹⁴⁶ Summit in November 2022, Qualcomm publicly announced the name of its family of new, custom CPU for Snapdragon platforms, Qualcomm [REDACTED] Qualcomm described that the [REDACTED] “groundbreaking technology will usher in a new class of incredibly powerful and efficient devices, transforming the industries for

¹⁴⁰ <<https://www.tomshardware.com/pc-components/cpus/arm-pc-market-share-shrinks-mercury-research>>.

¹⁴¹ <<https://www.tomshardware.com/pc-components/cpus/arm-pc-market-share-shrinks-mercury-research>>.

¹⁴² <<https://www.tomshardware.com/news/arm-based-cpus-set-to-double-notebook-pc-market-share-by-2027>>.

¹⁴³ I understand that [REDACTED]
[REDACTED]. See also, <<https://www.tomshardware.com/pc-components/cpus/arm-pc-market-share-shrinks-mercury-research>>.

¹⁴⁴ [REDACTED]

¹⁴⁵ [REDACTED]

¹⁴⁶ [REDACTED]

¹⁴⁷ <[https://www.qualcomm.com/news/onq/2022/11/qualcomm-\[REDACTED\]-custom-cpu-at-center-of-next-gen-premium-experiences-on-snapdragon-platforms](https://www.qualcomm.com/news/onq/2022/11/qualcomm-[REDACTED]-custom-cpu-at-center-of-next-gen-premium-experiences-on-snapdragon-platforms)>.

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[Qualcomm's] customers."¹⁴⁸ Qualcomm further described that the [REDACTED] Cores will be integrated across a "wide portfolio of Snapdragon powered products," including PCs, smartphones, advanced driver assistance systems,¹⁴⁹ extended reality,¹⁵⁰ and infrastructure networking solutions.¹⁵¹ In October 2023, Qualcomm announced the Snapdragon X Elite platform for the PC market as the first product that would incorporate an integrated [REDACTED] CPU.¹⁵²

59. [REDACTED]

[REDACTED]. The Futurum Group, a global technology research and advisory firm,¹⁵⁴ wrote that "Qualcomm's new Snapdragon X Elite platform does not just represent a significant milestone (and opportunity) for the company. It is also potentially a disruption milestone for the PC market as a whole, especially as x86's long-term relevance against Arm-based platforms grows into a bigger question mark."^{155,156} When discussing Qualcomm's ability

¹⁴⁸ <[https://www.qualcomm.com/news/onq/2022/11/qualcomm-\[REDACTED\]-custom-cpu-at-center-of-next-gen-premium-experiences-on-snapdragon-platforms](https://www.qualcomm.com/news/onq/2022/11/qualcomm-[REDACTED]-custom-cpu-at-center-of-next-gen-premium-experiences-on-snapdragon-platforms)>.

¹⁴⁹ According to Qualcomm, extended reality is "an umbrella term encapsulating Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR), and everything in between." See <<https://www.qualcomm.com/research/extended-reality>>.

¹⁵⁰ Advanced driver assistance systems are designed to provide warnings and/or features that assist the driver of a car and include features such as "forward collision warning" and "automatic emergency braking." See <https://www.americanbar.org/groups/tort_trial_insurance_practice/committees/automobile-litigation/safety_regulatory_considerations/>.

¹⁵¹ <[https://www.qualcomm.com/news/onq/2022/11/qualcomm-\[REDACTED\]-custom-cpu-at-center-of-next-gen-premium-experiences-on-snapdragon-platforms](https://www.qualcomm.com/news/onq/2022/11/qualcomm-[REDACTED]-custom-cpu-at-center-of-next-gen-premium-experiences-on-snapdragon-platforms)>.

¹⁵² <<https://www.qualcomm.com/news/releases/2023/10/qualcomm-unleashes-snapdragon-x-elite--the-ai-super-charged-plat>>.

¹⁵³ [REDACTED]

¹⁵⁴ <<https://futurumgroup.com/about-us/who-we-are/>>.

¹⁵⁵ <[https://futurumgroup.com/insights/qualcomm-snapdragon-x-elite-and-\[REDACTED\]-cpu-aim-to-disrupt-the-pc-market/](https://futurumgroup.com/insights/qualcomm-snapdragon-x-elite-and-[REDACTED]-cpu-aim-to-disrupt-the-pc-market/)>.

¹⁵⁶ I understand that Qualcomm's Snapdragon X Elite is a processor that features [REDACTED] and that "x86" is a widely used computer architecture for CPUs used by companies such as Intel

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to gain market share in the PC market, the Futurum Group stated that “[i]f Qualcomm’s ability to build a juggernaut partnership ecosystem for its automotive platforms in just a few years is any indication, [then Futurum Group does] not expect a lot of friction in the PC space, especially given Qualcomm’s already well-established relationship with mobile and PC [original equipment manufacturers].”¹⁵⁷ Futurum Group further stated that it “expect[s] that every major Windows PC [original equipment manufacturer] will be turning to Qualcomm to help probe demand for their own take on the Windows-on-Arm PC.”¹⁵⁸

60. According to an April 2023 article, “Counterpoint [Research] believes that once Qualcomm develops competitive Arm SoCs compatible with Windows, Arm’s market share in the PC world will increase,” noting that it expects Arm’s market share to “at least double their share in several years.”¹⁵⁹

61. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Corporation and Advanced Micro Devices, Inc. See

<<https://www.qualcomm.com/news/releases/2023/10/qualcomm-unleashes-snapdragon-x-elite--the-ai-super-charged-plat>>; <<https://www.lenovo.com/us/en/glossary/x86/>>.

¹⁵⁷ <[https://futurumgroup.com/insights/qualcomm-snapdragon-x-elite-and-\[REDACTED\]-pu-aim-to-disrupt-the-pc-market/](https://futurumgroup.com/insights/qualcomm-snapdragon-x-elite-and-[REDACTED]-pu-aim-to-disrupt-the-pc-market/)>.

¹⁵⁸ <[https://futurumgroup.com/insights/qualcomm-snapdragon-x-elite-and-\[REDACTED\]-cpu-aim-to-disrupt-the-pc-market/](https://futurumgroup.com/insights/qualcomm-snapdragon-x-elite-and-[REDACTED]-cpu-aim-to-disrupt-the-pc-market/)>.

¹⁵⁹ <<https://www.tomshardware.com/news/arm-based-cpus-set-to-double-notebook-pc-market-share-by-2027>>.

¹⁶⁰ [REDACTED]

¹⁶¹ [REDACTED]

¹⁶² [REDACTED]

[REDACTED]

[REDACTED]

¹⁶³ [REDACTED]

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62. Further, I understand that Qualcomm has [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

63. Arm itself recognized that Qualcomm's innovative product could expand Arm's presence in the Windows-based PC market. Upon seeing initial performance reports for [REDACTED] Arm concluded that Qualcomm had indeed "invested sufficiently to meaningfully grow the [Windows on Arm] market."¹⁶⁶ Arm's internal analysis found that Qualcomm's innovative product would dramatically grow the "Windows on Arm" market.¹⁶⁷

64. As described in the preceding paragraphs, Qualcomm has plans in place to gain significant market share with the [REDACTED] in the PC market, and third parties, as well as Arm itself, are optimistic on Qualcomm's ability to gain such market share. Further, any market share that Qualcomm gains in the PC market is market share gained for Arm versus x86 alternatives. Further, Qualcomm's sales of [REDACTED] will generate royalties for Arm under the Arm / Qualcomm ALA. Therefore, Qualcomm's development of the [REDACTED] will generate additional royalties for Arm from an increased volume of shipments for the PC market.

¹⁶⁴ [REDACTED]

¹⁶⁵ [REDACTED]

¹⁶⁶ ARM_01292638-644 at '642.

¹⁶⁷ ARM_00112064-067 at '064.

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E. Mr. Schoettelkotte ignores the extensive record evidence showing that Arm has quantified what it contends to be adequate compensation

65. Mr. Schoettelkotte contends that damages cannot be quantified, while ignoring the extensive evidence that Arm has expended time and effort quantifying what it sought as adequate compensation. I understand Qualcomm does not agree with Arm's quantifications.¹⁶⁸ But whether Qualcomm agrees with the quantification is a separate question from the question of whether damages *can* be quantified. And Arm's own analyses show that the answer to the question of whether damages *can* be quantified is "yes."

i. At the time of the Arm / Nuvia ALA, Arm calculated the expected total contract value ("TCV") of the Arm / Nuvia license agreements

66. I understand that at the time of the Arm / Nuvia license agreements were being negotiated in 2019, [REDACTED]

[REDACTED] For example, in a spreadsheet created in May 2019 (prior to the execution of the Nuvia ALA and TLA),¹⁷⁰ [REDACTED]

[REDACTED]
[REDACTED]

67. In a May 2021 email between two Arm personnel, Ivan Knez, former Strategy and Operations Director at Arm,¹⁷³ and Andrew Howard, VP Client Commercial Strategy at Arm,¹⁷⁴

¹⁶⁸ Deposition of Paul Williamson, November 9, 2023, p. 197.

¹⁶⁹ According to Mr. Williamson, TCV is "a number that we use internally when we are looking at our sales opportunities to describe the scale of total revenues payable to Arm at a point in time and over a particular window of years." See Deposition of Paul Williamson, November 9, 2023, p. 201.

¹⁷⁰ The metadata of the excel spreadsheet shows a date created of May 10, 2019.

¹⁷¹ I understand that "Telecaster" was Arm's internal name for Nuvia. See ARM_00057479-481.

¹⁷² ARM_00083356, tab "Financial Scenario." The royalty model estimates the number of server units, Nuvia's market share, the number of server chips, average selling price and expected royalty per chip from 2024 to 2026. Other ARM analyses created during the Nuvia ALA negotiations estimated similar figures. See ARM_00082714 at '716 and ARM_00082717 estimated that Arm would receive a total of \$88.94 million without discounting in fees and royalties for the Nuvia ALA.

¹⁷³ <<https://www.linkedin.com/in/ivan-knez/>>.

¹⁷⁴ ARM_01294035-036 at '036.

According to the testimony of Mr. Williamson,

The

Additionally, a January

32

ii. Arm inflated its valuation of the Nuvia ALA during its commercial negotiations with Qualcomm

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71. For example, in May 2021, Arm prepared an internal [REDACTED]
[REDACTED]
[REDACTED] These more favorable assumptions showed
[REDACTED]
[REDACTED] In an email discussing the analysis, Mr. Howard noted that the analysis showed
[REDACTED]
[REDACTED] The same email notes that the [REDACTED]
[REDACTED] the summer of 2019.¹⁹⁵ Mr. Williamson testified that he [REDACTED]
[REDACTED]
[REDACTED] However, there are internal Arm documents
from 2021 illustrating that [REDACTED]
[REDACTED] As part of that discussion,
Arm discussed [REDACTED]
[REDACTED] In other words, these documents illustrate that [REDACTED]
[REDACTED]
[REDACTED]

¹⁹¹ I understand that “10YP” stand for “ten-year plan.” See Deposition of Rene Haas, December 12, 2023, p. 73.

¹⁹² ARM_01294035-036 at ‘035.

¹⁹³ ARM_01294035-036. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]. See ARM_01294037, tab “Royalty Model.”

¹⁹⁴ ARM_01294035-036.

¹⁹⁵ ARM_01294035-036 at ‘036.

¹⁹⁶ Deposition of Paul Williamson, November 9, 2023, p. 201.

¹⁹⁷ ARM_00081942-44 at ‘943-‘944.

¹⁹⁸ ARM_00081942-44 at ‘943.

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72. In another May 2021 email among Arm personnel regarding Arm's proposal to Qualcomm, Mr. Howard stated that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Mr. Howard further noted in the email that [REDACTED]

[REDACTED] This

2021 email indicates [REDACTED]

[REDACTED]

[REDACTED]

iii. Arm sought monetary payment from Qualcomm in connection with the Nuvia acquisition

73. Consistent with the above-described internal analyses, Arm sought payment from Qualcomm in connection with the Nuvia acquisition in the form of different combinations of [REDACTED]. Arm and Qualcomm engaged in extensive back and forth negotiations regarding Arm's request for compensation in connection with the acquisition.

74. For example, in an Arm presentation entitled [REDACTED] on a slide entitled [REDACTED] Arm identifies (a) an

[REDACTED]

[REDACTED]

[REDACTED]

¹⁹⁹ ARM_00110165-168 at '165-'166. Based on this email, the \$245 million to \$355 million range reflects a nominal amount (i.e., without any calculation of present value) and includes a \$25 million Arm / Nuvia ALA license fee.

²⁰⁰ ARM_00110165-168 at '165-'166.

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78. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

79. In June 2021, Mr. Abbey sent a proposal to RK Chunduru, former Chief Procurement Officer at Qualcomm,²¹² and Ziad Asghar, Senior Vice President of Product Management at Qualcomm.²¹³ In the June 2021 proposal, Arm offered [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²⁰⁹ QCARM_3535536.

²¹⁰ QCARM_3535536.

²¹¹ QCARM_3535536.

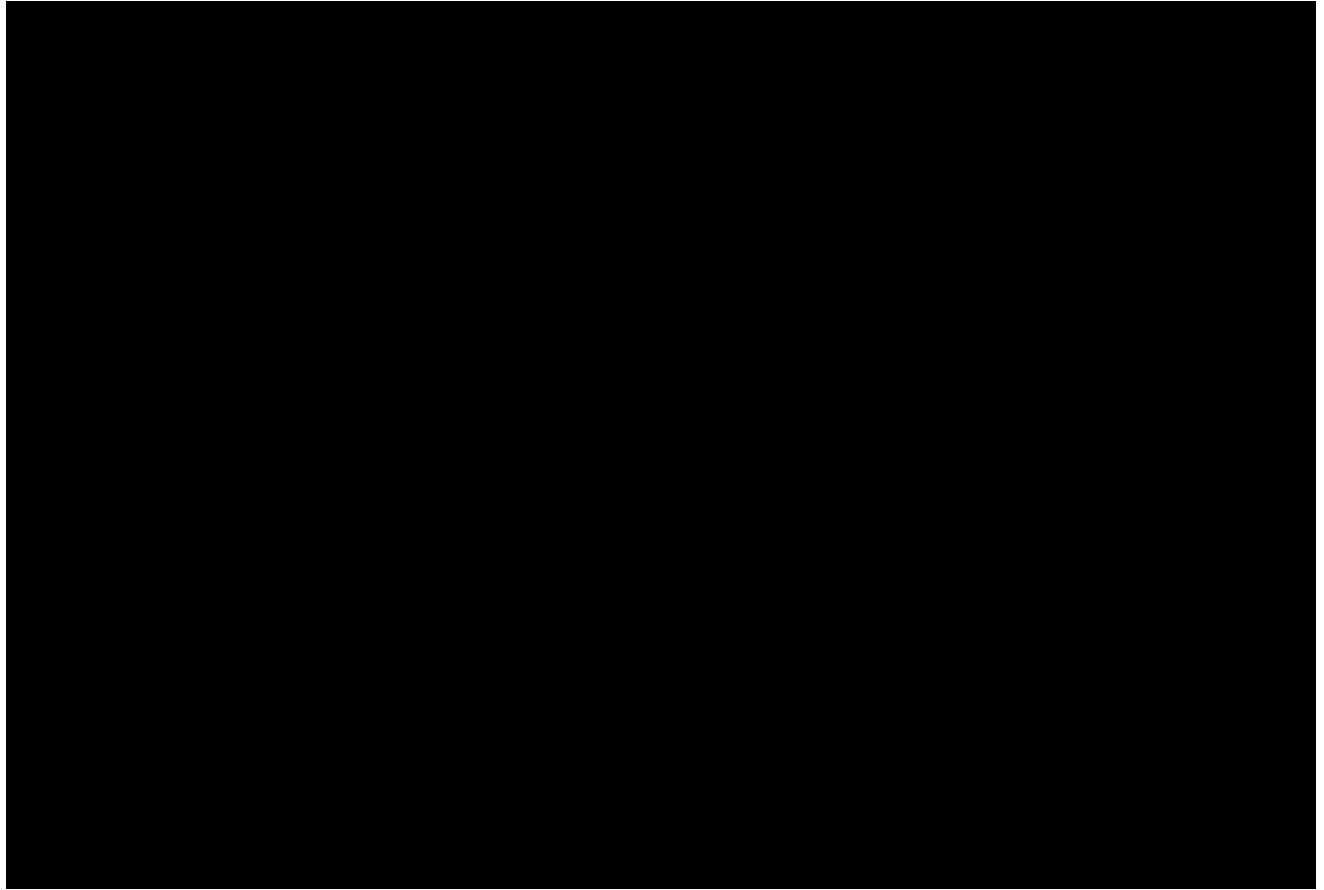
²¹² Deposition of Ramakrishna Chunduru, October 20, 2023, p. 10.

²¹³ Deposition of Ziad Asghar, November 8, 2023, p. 27; see QCARM_7434227 and QCARM_7434228-229.

²¹⁴ QCARM_7434227; QCARM_7434228-229 at '229.

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Figure 5: Arm's Proposal in June 2021²¹⁵



80. In a June 2021 email communication between Mr. Segars and Mr. Amon

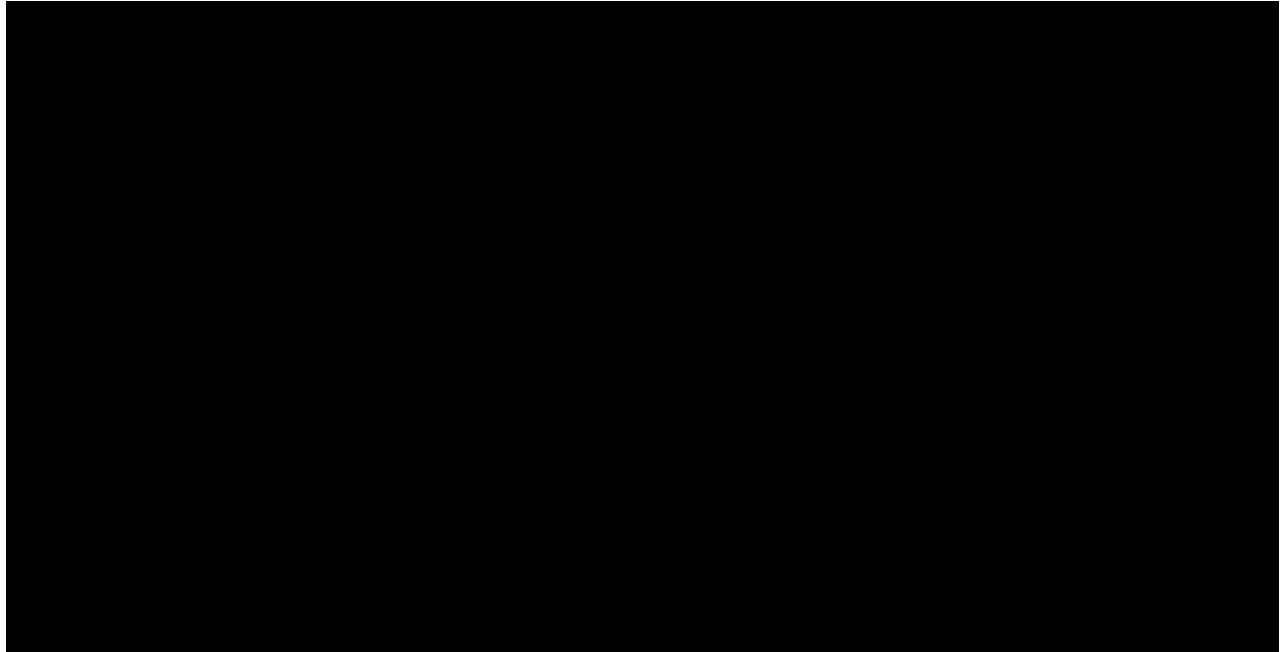
[REDACTED], Mr. Segars proposed ([REDACTED])
[REDACTED]
[REDACTED]
[REDACTED]

²¹⁵ QCARM_7434227; QCARM_7434228-229 at '229.

²¹⁶ ARM_01305785-789 at '789.

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Figure 6: [REDACTED]



81. In the same email thread, Mr. Amon made a counter proposal of ([REDACTED])

[REDACTED]

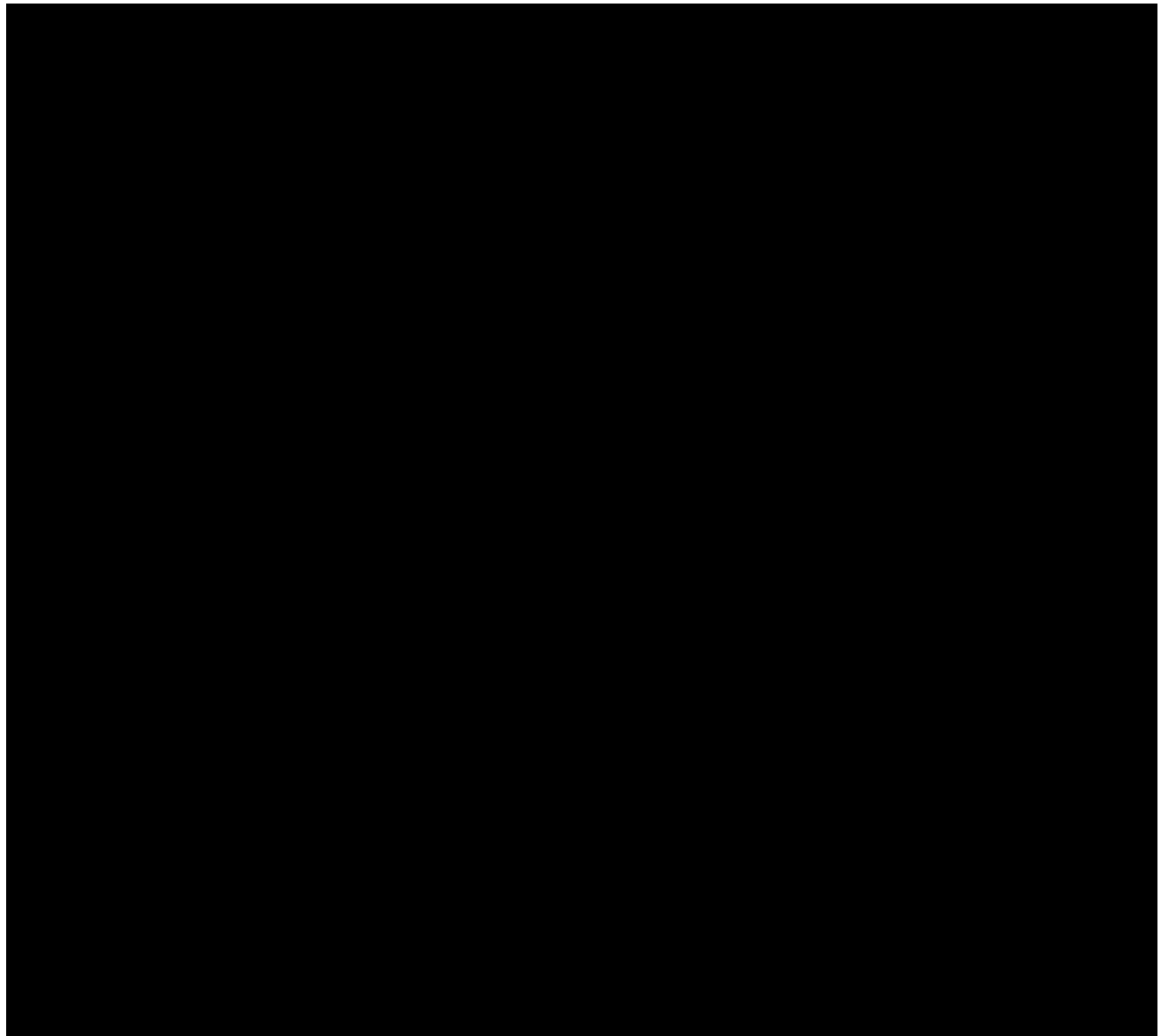
[REDACTED]

[REDACTED]

[REDACTED]

²¹⁸ [REDACTED] 01305785-789 at '789.
ARM_01305785-789 at '788.

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82. In an August 31, 2021 document entitled [REDACTED] [REDACTED] [REDACTED] [REDACTED] which appears to have been presented and sent to Qualcomm,²²⁰ Arm proposed several options of [REDACTED] [REDACTED] as shown in the figure below, and in particular, [REDACTED] [REDACTED]

²¹⁹ ARM_01305785-789 at '788.

²²⁰ QCARM_3920067; QCARM_7505464.

²²¹ ARM_00000017-018 at '018.

1. *Journal of the American Medical Association*, 1997; 277: 1001-1005.

84. Although these commercial negotiations illustrate that damages are calculable, the amount of actual damages is not necessarily tied to offers made by either party. In commercial negotiations, parties have different positions that might not reflect the actual value of the contract at issue, or the amount that would ultimately be agreed to in the negotiation. For example, as noted above, prior to the execution of the Arm / Nuvia ALA, [REDACTED]

²²³ Deposition of Paul Williamson, November 9, 2023, p. 197. See also ARM_00063607-610 at '610.

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[REDACTED] (not in present value), but after Qualcomm's acquisition of Nuvia, [REDACTED]

[REDACTED] this analysis was used for the purposes of negotiating with Qualcomm.²²⁴

Therefore, the [REDACTED]

[REDACTED] are more indicative of Arm's total contract value without considering negotiating positions with Qualcomm.²²⁵

85. The relevant issue here is not whether Arm's inflated value of the TCV is correct, but instead that Arm was able to calculate a value that it used in negotiations to seek compensation for Qualcomm's alleged use of the Nuvia-based designs, thus illustrating that the value of the Nuvia agreement could be monetized and calculated. Yet Mr. Schoettelkotte ignores this evidence of valuation.

iv. Commercial proposals can be used as proxy for adequate compensation only if appropriate inputs are utilized

86. If any of the proposals described above were to be used as a proxy for a damages calculation, or adequate compensation, one would need to be cognizant of ensuring that the appropriate inputs are applied. Specifically, royalty rates based on Arm's proposals in which Qualcomm would pay Nuvia ALA rates for all market segments would be inappropriate to use in a damages calculation. Not only does this contradict several of Arm's proposals to Qualcomm, but it also contradicts Arm's own documents and deponents, which suggested that the Nuvia royalty rates are for server only and that server royalty rates differ from Arm's royalty rates applicable to other market segments, as described below.

²²⁴ ARM_00110165-168 at '165-'166. [REDACTED]

[REDACTED] See also ARM_00096011 and ARM_00086244.

²²⁵ ARM_00083356, tab "Financial Scenario."

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87. In general, I understand that Arm considers the market segment of the end product when setting royalty rates for its customers.²²⁶ Mr. Schoettelkotte also admits in his report that Arm [REDACTED] In Arm's April – June 2019 price book, which I understand Arm uses to propose initial offers to customers prior to negotiations,²²⁸ [REDACTED]

88. Based on my review of Arm's testimony, I understand that [REDACTED]
[REDACTED] For example, Mr. Haas testified that [REDACTED]
[REDACTED]
[REDACTED] Additionally, Tim Herbert, Arm's primary negotiator for the Nuvia ALA,²³¹ [REDACTED]

[REDACTED]²
89. Arm's documents also indicate that [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]³³ In a January 2021 Arm presentation, Arm states that "[REDACTED]"

²²⁶ See, e.g., ARM_01226630-706 at '647-'648.

²²⁷ Schoettelkotte Report, p. 37.

²²⁸ ARM_01226630-706 at '630.

²²⁹ ARM_00118835-938 at '846.

²³⁰ Deposition of Rene Haas, December 12, 2023, p. 96.

²³¹ Deposition of Tim Herbert, October 25, 2023, p. 58.

²³² Deposition of Tim Herbert, October 25, 2023, pp. 217-218, 252-253.

²³³ QCARM_3839896-911 at '908; ARM_00118835-938 at '846.

[illegible]

234 ARM_00079507-514 at '509.

(Ares is an Arm product that includes servers as a use case) also utilize Arm CPUs for the server market. See <<https://nvidia.com/news/nvidia-introduces-grace-cpu-superchip>> and ARM 00118835-938 at '840.

²³⁷ I understand that Arm performed calculations assuming an 8 integer CPU architecture core. See ARM 00086829-837 at '833; ARM 01426109-156 at '128.

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[REDACTED] Arm's 2019 10-year plan spreadsheet shows [REDACTED]

[REDACTED]

[REDACTED]. As such, applying server market royalty rates to non-server markets would be inconsistent with Arm's past licensing practices and overstate Arm's royalties.

F. Mr. Schoettelkotte ignores available methodologies to quantify damages

91. Mr. Schoettelkotte ignores that, even if Arm had not attached a value to the issues in this litigation (as it has, as discussed above), there are well established methodologies that could be used to calculate damages—I discuss two below: (1) quantification of the alleged head start damages, and (2) utilization of previous design transfer fees as a proxy for adequate compensation.

i. Arm's damages from Qualcomm's alleged head start can be quantified

92. Arm alleges that Qualcomm received a head start by using certain Arm intellectual property.²⁴¹ That is, Qualcomm was allegedly able to save development time and will be able to commercialize its custom CPUs for certain market segments earlier than it otherwise would have.²⁴² For head start damages in this litigation, this benefit, (i.e., Qualcomm's head start) would be tied to its alleged improper use of certain technology as opposed to other independent development efforts.

²³⁹ ARM_01425186, tab "Handsets roll-up."

²⁴⁰ ARM_01291202, tab "10Y Roll Up."

²⁴¹ Complaint, p. 10.

²⁴² Complaint, p. 10.

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93. Mr. Schoettelkotte claims there is a head start (albeit he appears to attribute the purported head start to events other than Defendants' alleged wrongful conduct, as discussed in Section VI.G.ii.a below), but then he claims that damages from a purported head start are not quantifiable.²⁴³ He is incorrect. To the extent that there is an alleged head start, Arm's damages can be quantified—Arm's alleged damages would be based on the extent to which Qualcomm's alleged head start harmed Arm, net of any benefits.

94. In my experience, damages stemming from a head start are calculated using commonly applied methodologies in disputes regarding one party's alleged benefit from use of another's party's intellectual property.²⁴⁴ Here, assuming there is a head start as Arm claims, in the but-for world, Qualcomm's development of the [REDACTED] takes longer than it otherwise would have. During this additional development time, Qualcomm would still use Arm-developed CPUs and be subject to TLA rates. From Arm's perspective, the difference between (1) the TLA rates that Arm would have received from Qualcomm in the but-for world and (2) the ALA rates that Arm will receive from Qualcomm in the actual world during the head start period for each market segment represents Arm's lost royalties from Defendants' alleged wrongful conduct.²⁴⁵ These calculations can be performed using the same types of observable and quantifiable inputs that Arm and Qualcomm used in the above-described negotiations related to the Nuvia acquisition.

ii. Qualcomm's claimed head start, according to Arm

95. In the complaint in this matter, Arm states that "[b]y entering into the acquisition of Nuvia and transferring the rights and technology developed under the Nuvia licenses without

²⁴³ Schoettelkotte Report, pp. 48-50.

²⁴⁴ See, e.g., The Sedona Conference, *Commentary on Monetary Remedies in Trade Secret Litigation*, 24 SEDONA CONF. J. 349 (2023).

²⁴⁵ Contrary to Mr. Schoettelkotte's claims, Qualcomm's alleged head start does not fundamentally change the market dynamics. I discuss this in more detail in Section VI.G.i. below.

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Arm's consent, Qualcomm thus greatly accelerated its ability to bring to market custom-designed processor cores."²⁴⁶ I understand that Arm does not assert that Qualcomm could not have built a custom CPU at all, but instead that Qualcomm's development of a custom CPU was accelerated. Arm's documents also identify a perceived head start received by Qualcomm. In internal communications about negotiations regarding Qualcomm's acquisition of Nuvia, Mr. Haas states that [REDACTED]

96. Further, in a presentation discussing potential [REDACTED] with Qualcomm, Arm states that [REDACTED]

[REDACTED]⁴⁸ Further, in a January 2021 internal Arm email, Peter Greenhalgh, SVP Technology & Fellow at Arm,²⁴⁹ states that "[REDACTED]

[REDACTED] Mr. Schoettelkotte similarly claims that [REDACTED] stating "[REDACTED]

iii. Arm's own analyses show that a head start can be quantified

97. In this matter, the financial consequence of Qualcomm's alleged head start to Arm would be that Qualcomm [REDACTED] earlier

²⁴⁶ Complaint, p. 10.

²⁴⁷ ARM_00081945-947 at '945.

²⁴⁸ ARM_00079507-514 at '509.

²⁴⁹ <<https://www.linkedin.com/in/peter-greenhalgh-8900789b/>>.

²⁵⁰ ARM_00104678. As expressed elsewhere, I understand Qualcomm disagrees that it needed any "rights" from Arm to "port the Nuvia design."

²⁵¹ Schoettelkotte Report, p. 48.

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than it otherwise would have for certain products/market segments. I understand that Qualcomm currently pays Arm TLA rates for Arm-developed cores, but that a custom-developed core would be subject to its lower ALA rates.²⁵²

98. Arm's internal documents show that this head start can be quantified. For example, Arm has already run overall calculations, in the context of a negotiation between the parties, in which it sought to "maximize the value of the assignment" and "be as creative as possible,"²⁵³ showing its asserted anticipated losses as a result of this shift from higher TLA rates to lower ALA royalty rates. In 2021, Arm prepared royalty forecasts showing Arm's expected royalty revenue from Qualcomm under several different scenarios, some of which assumed that Qualcomm completely transitioned away from Arm "off-the-shelf" implementation cores²⁵⁴ to custom cores.

99. For example, in a January 2021 internal Arm presentation regarding Qualcomm and Nuvia, Arm prepared a Qualcomm royalty forecast, which showed Arm's forecasted royalties assuming that Qualcomm's TLA implementation rates applied and then assuming Qualcomm's ALA ("ARCH") rates applied.

²⁵² Deposition of Cristiano Amon, November 15, 2023, pp. 15-16, 60-61.

²⁵³ ARM_00081942-944 at '944.

²⁵⁴ I understand that a CPU that is fully designed at Arm that is then licensed or sold by Arm is called an implementation core, which is licensed under an Arm TLA. Deposition of Richard Grisenthwaite, November 15, 2023, p. 18; Deposition of Lynn Couillard, November 2, 2023, p. 19.

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[REDACTED]

[REDACTED]

100. In a January 2021 presentation titled [REDACTED]

[REDACTED] Arm forecasted [REDACTED]

[REDACTED] In its “10Yr Plan” scenario based on Qualcomm’s TLA rates,²⁵⁷ [REDACTED]

[REDACTED] However, in a “Nuvia Full

²⁵⁵ ARM_00079507-514 at ‘511.

²⁵⁶ ARM_01266931-990 at ‘966.

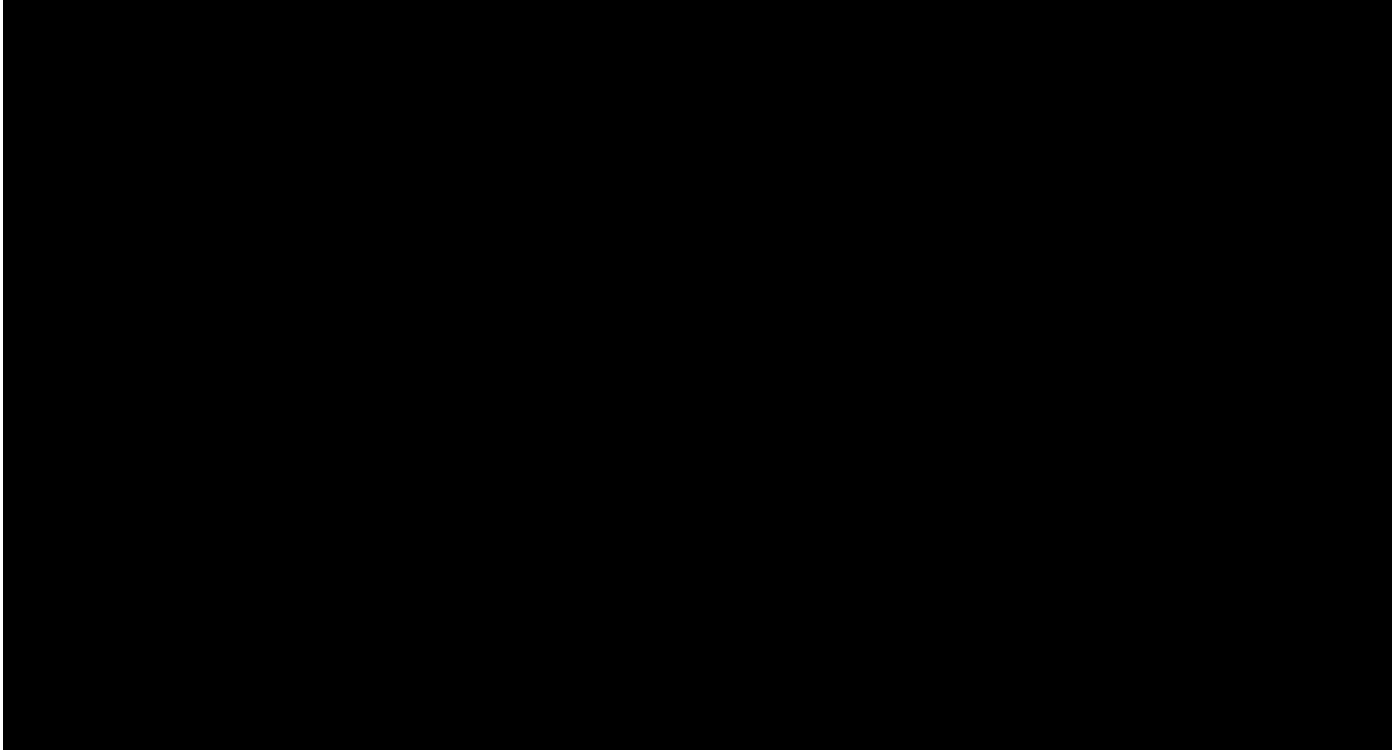
²⁵⁷ I understand that Arm’s “10yr” plan scenario for Qualcomm estimates royalties assuming TLA rates apply in the mobile market. See ARM_01281879, tabs “Impact Roll Up” and “Qualcomm.” For example, ARM_01281879, tab “Impact Roll Up” shows Arm’s “10yp sprdsht” royalties for Qualcomm, which match the royalties also shown at Tab “Qualcomm.” On the “Qualcomm” tab, the royalties per unit in 2022, 2023, and 2024 (rows 235, 254, and 273 on the spreadsheet) are equivalent to those outlined in Qualcomm’s “Master Royalty Schedules” with Arm for the Matterhorn ELP, Makalu ELP, and Hunter ELP, respectively. See QCARM_3429791-872 at ‘808. I understand from testimony in this case that Matterhorn, Makalu, and Hunter refer to Arm-developed CPUs, and as such would be subject to TLA rates. See Deposition of Will Abbey, October 27, 2023, p. 157; Deposition of Richard Grisenthwaite, November 15, 2023, p. 177; Deposition of Rohit Singh, September 22, 2023, pp. 14, 108.

²⁵⁸ ARM_01266931-990 at ‘966.

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Arch, Replace ELP from Logan ...” scenario, Arm expected annual smartphone royalties from Qualcomm to decrease after 2023 to approximately \$150 million by 2030.²⁵⁹

Figure 11: Arm’s Qualcomm 10 Year Plan Royalty Forecast²⁶⁰



101. In a March 2021²⁶¹ Arm presentation with a file name of [REDACTED]

[REDACTED]
[REDACTED].

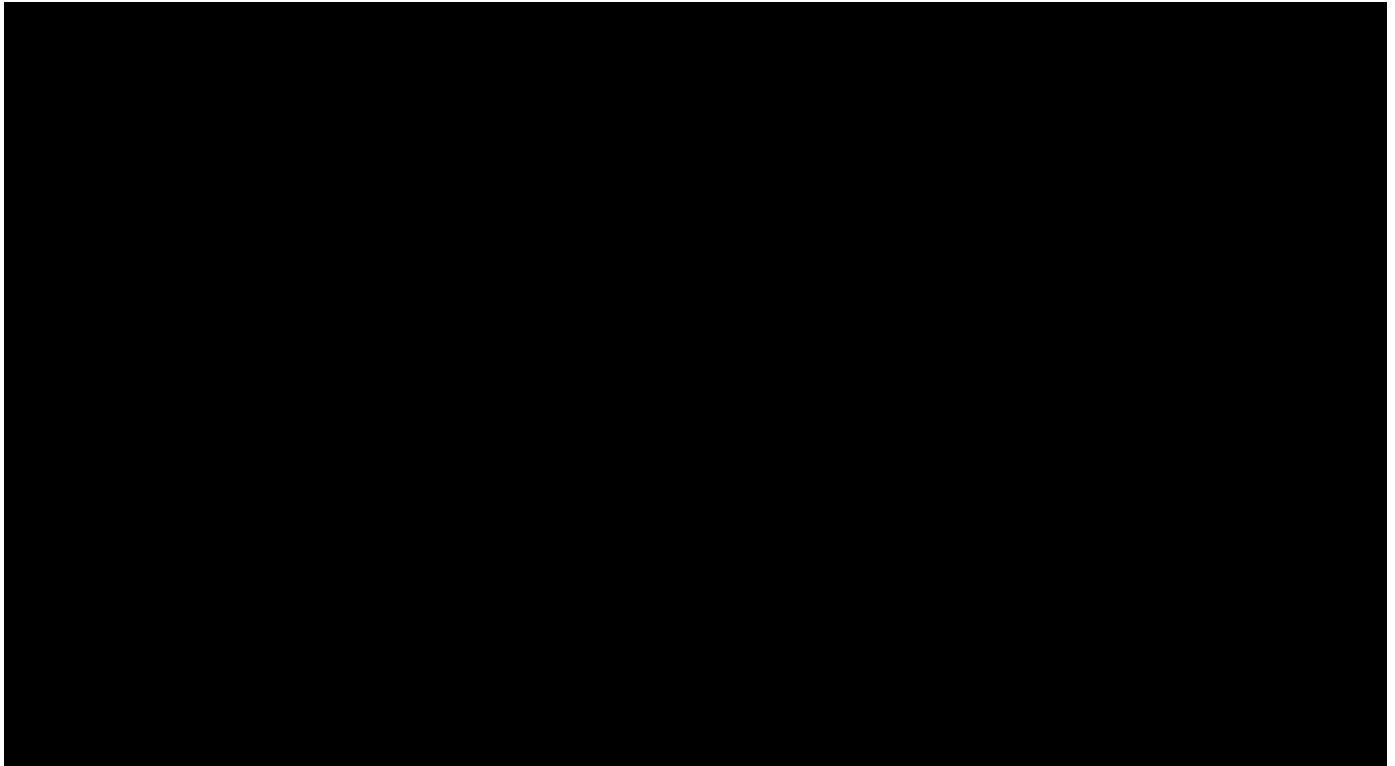
²⁵⁹ ARM_01266931-990 at ‘966.

²⁶⁰ ARM_01266931-990 at ‘966.

²⁶¹ ARM_00097388-018 at ‘394; it appears that these projections were prepared in March 2021 and kept as is through May 2021, based on email correspondence between Arm personnel. See ARM_00087367-371 at ‘369-‘370.

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[REDACTED]



102. As shown in the figure above, Arm calculated the total royalty difference from each of these scenarios to its 10-year plan projections.

103. Arm's analyses described above illustrate that loss of royalties from Qualcomm's commercialization of a custom CPU can be quantified. I do not offer an opinion as to whether these particular calculations should be utilized to actually calculate damages, as they reflect certain assumptions that may not be appropriate—for example, at least in some scenarios, they unilaterally apply Nuvia's rates to all of Qualcomm's shipments. However, these calculations show how Arm could calculate its alleged harm under a head start damages theory. It is important to also note that lost royalties calculated by Arm in and of itself are not a damages calculation. That is, Arm's losses are not the difference between its expected royalties from Qualcomm under its TLA versus those expected under its ALA for an indefinite period of time. Rather, these

²⁶² ARM_00097388-018 at '394.

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analyses demonstrate that Arm has the ability to prepare calculations and projections of future royalty rates under different scenarios, which are the very factors that determine damages in a head start analysis.

104. The damages calculation would be based on a but-for world where Qualcomm acquires Nuvia and develops its custom CPUs under Qualcomm's existing ALA, but with a delay versus Qualcomm's actual development timeline equivalent to the head start period. The period of head start is tied to the claims made in this matter regarding the specific intellectual property that was allegedly improperly used and the benefit received from that alleged use, as opposed to other unrelated contributions by Defendants in their development efforts.

105.

106. From a damages perspective, the maximum head start

[REDACTED]. In general,
there could be design efficiencies that would limit the time required to get to that point to [REDACTED]
[REDACTED] as Nuvia/Qualcomm could be more efficient in duplicating efforts the second time

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around. The head start period could be further limited when focusing only on the allegedly improperly used Arm intellectual property versus unrelated intellectual property and development efforts undertaken by Nuvia and Qualcomm.

107. Once the head start period is determined, the specific calculation of damages would flow directly from the application of royalty rates to units sold over the appropriate head start period. Further, because Qualcomm intends to release its custom CPU products in various market segments at different times, and because of the dynamics that are unique to each market segment, Qualcomm's alleged head start and Arm's resulting damages, if any, would need to be quantified on a market-by-market basis, as discussed below.

a. Windows-Based PC Market

108. As described above, Qualcomm's first product containing custom cores that Arm alleges to incorporate improperly retained Arm intellectual property is the [REDACTED] [REDACTED]²⁶³ The first product [REDACTED] is the Snapdragon X Elite platform, expected to be introduced in mid-2024.²⁶⁴

109. I understand that Qualcomm's and Arm's agreements set forth an ALA royalty rate for custom cores and a TLA royalty rate that applies in the event that Qualcomm uses an Arm-designed CPU in its products.²⁶⁵ Assuming Qualcomm's alleged head start advantage allowed it to enter the market with a product incorporating [REDACTED] earlier than it otherwise would have, Arm's damages in the PC market would be determined by: (1) calculating but-for royalties assuming that Qualcomm would continue to use Arm-designed CPU cores in its PC products and pay the TLA royalty rate, which would continue until but-for market entry (incorporating the delay

²⁶³ [REDACTED]
[REDACTED]; Qualcomm Incorporated FQ1 2024 Earnings Call Transcripts, January 31, 2024, p. 5.
²⁶⁵ See, e.g., QCARM_0343143-222 at '150-'151.

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in market entry due to Qualcomm's alleged head start) and (2) subtracting actual royalties over the same period paid under Qualcomm's ALA for the custom [REDACTED] used. As noted above, I understand that Arm does not claim that it would prevent Qualcomm from developing a custom CPU using Nuvia personnel and other intellectual property, but that Qualcomm allegedly received a head start by using certain Arm intellectual property that Arm claims accelerated Qualcomm's transition to custom CPUs, which results in a transition to lower ALA royalty rates.

110. Arm's lost royalties would also need to account for the difference in expected Qualcomm sales volumes in the but-for world versus the actual world. As discussed above, Qualcomm's Snapdragon X Elite has received positive reviews, with analysts and technology research and advisory firms anticipating that the product will allow Qualcomm (and thus Arm) to gain market share in the Windows-based PC segment.²⁶⁶ If Qualcomm's Arm-compliant custom CPU (e.g., Snapdragon X Elite) has sufficiently higher volumes than its current Windows-based PC product with an Arm-supplied core, then, although the per-unit royalty would be less, Arm may actually receive a net benefit in the Windows-based PC market due to Qualcomm's increased volume sales occurring earlier than they otherwise would have.

b. Mobile Market

111. I understand that, in general, Qualcomm's mobile product development and launch roadmap follows a particular cadence.²⁶⁷ For example, Mr. Herbert testified:²⁶⁸

In the semiconductor world, typically companies will develop a very high-end product and target a very high-end market where it fits, and it will be for the most expensive flagship product that they will offer. And then over time they will continue to develop new products that hit higher

²⁶⁶ <[https://futuresgroup.com/insights/qualcomm-snapdragon-x-elite-and-\[REDACTED\]-cpu-aim-to-disrupt-the-pc-market/](https://futuresgroup.com/insights/qualcomm-snapdragon-x-elite-and-[REDACTED]-cpu-aim-to-disrupt-the-pc-market/)>; <<https://www.tomshardware.com/news/arm-based-cpus-set-to-double-notebook-pc-market-share-by-2027>>; <<https://www.cnet.com/tech/computing/qualcomms-pc-chip-could-mean-windows-pcs-as-good-as-apple-macbooks/>>.

²⁶⁷ [REDACTED]

²⁶⁸ Deposition of Tim Herbert, October 25, 2023, pp. 291-292.

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performance points. And so the road map of silicon starts to -- there is a -- a gradual depreciation in terms of the performance that's possible. So they will take those older products that are working their way down in their road map and supply them to markets that they weren't originally targeted for.

112. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

113. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

269 [REDACTED]

270 [REDACTED]

271 [REDACTED]

272 [REDACTED]

273 [REDACTED]

274 [REDACTED]

275 [REDACTED] See also ARM_00086247-251 at '248 in which Arm conducted an analysis just for the premium sub-segment.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

114. For each mobile sub-segment that Qualcomm purportedly received a head start advantage, Arm's damages would be determined by: (1) calculating but-for royalties assuming the TLA royalty rate would continue until but-for market entry (incorporating the delay in market entry due to Qualcomm's alleged head start) and (2) subtracting actual royalties over the same period.

115. The calculation of but-for and actual future royalties requires inputs regarding the expected TLA and ALA royalty rates, as well as expected sales volumes in each market segment, which may be different for a CPU developed under a TLA vs. a CPU developed under an ALA (as discussed for the PC market segment above). Further, any potential lost royalties would have to consider whether Qualcomm's improved cores would shift sales from other Arm licensees that have ALAs. Shifting royalties from products licensed under one ALA to another ALA may not cause any harm to Arm at all, and, depending on the respective royalty rates, may actually benefit Arm.

116. In sum, Arm's damages resulting from Qualcomm's alleged head start due to its use of the at-issue intellectual property can be calculated with reasonable certainty. Further, these damages would provide adequate compensation to Arm as it ties the alleged harm (i.e.,

276

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lost royalties) back to the specific alleged wrongful conduct (i.e., Defendants' breach and alleged improper use of Arm's intellectual property).

iv. Arm's previous design transfer fees demonstrate its acceptance of monetary compensation in other transactions involving Arm licensees

117. While I understand that Qualcomm asserts that a novation, or an assignment of contracts between parties,²⁷⁸ is not necessary, previous consents and novations, along with associated fees, demonstrate that Arm was willing to accept such transfer fees as adequate compensation in other transactions involving Arm licensees. I note that I do not have knowledge as to whether any novation or assignment was required in these prior instances or the basis for the transfer fees. However, Arm's acceptance of a fee in these situations illustrates that Arm was willing to accept monetary compensation in other acquisitions involving Arm licensees.

118. I understand that Arm may consent or novate agreements upon the acquisition of a licensee. For instance, Mr. Haas testified that he was unaware of any transaction aside from Qualcomm's acquisition of Nuvia where there was no consent. Mr. Haas testifies:²⁷⁹

A: No. It -- what -- what my recollection was, what we disclosed was a pretty simple event chain relative to: Company A buys Company B. Company A needs to obtain written consent. Written consent generally happens. It didn't happen in this case, and we had no choice. Pretty fundamental.

A The -- when -- whenever -- whenever a company who has [REDACTED]. This is -- 100 times out of 100 times, this is what is required and then executed. Generally, but not always, there are fees associated with it. So that's what this was intending to suggest.

²⁷⁸ Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Amended Counterclaim, September 30, 2022, pp. 6-7.

²⁷⁹ Deposition of Rene Haas, December 12, 2023, pp. 65, 218.

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119. I understand that Arm has consented and novated agreements in prior transactions. As noted above, I have no knowledge and offer no opinions regarding whether a novation or consent was required. For example, in an August 2020 email, Arm states that there were [REDACTED]²⁸⁰ In the corresponding spreadsheet, Arm [REDACTED]

[REDACTED]¹ Additionally, in an interrogatory response, Arm confirms that [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

120. It is evident that Arm has consented and novated agreements in prior transactions, however, information concerning the associated assignment or transfer fee is limited. Based on my review of the available production and testimony produced in this matter and public information, I summarize some of the available transfer fee information relating to exemplary transactions involving consent or novation in the following paragraphs.

121. In or around 2016, Cavium acquired the Vulcan architecture from Broadcom.²⁸³ In a November 2016 email, Todd Lepinski, former VP of Sales at Arm,²⁸⁴ states that “[REDACTED]
[REDACTED]
[REDACTED] I understand [REDACTED]
[REDACTED]⁶ The contemplated numbers in the

²⁸⁰ ARM_00095789-790.

²⁸¹ ARM_00095791, tab “Novations and Coc.”

²⁸² Arm Ltd.’s Second Supplemental Objections and Responses to Qualcomm’s First Set of Interrogatories (Nos. 1-11), November 17, 2023, pp. 78-79.

²⁸³ <<https://www.eweek.com/servers/cavium-introduces-thunderx2-arm-server-chip-for-data-center-systems/>>.

²⁸⁴ <<https://www.linkedin.com/in/todd-lepinski-ababaa9/>>.

²⁸⁵ ARM_01235135-137 at ‘136.

²⁸⁶ ARM_01426109-156 at ‘156.

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Cavium / Vulcan transaction were less than the original license fee. However, I am unaware of any information that confirms the actual amount of the fee associated with the Cavium / Vulcan transaction.

122. In April 2020, Infineon Technologies AG, an ALA licensee,²⁸⁷ acquired Cypress Semiconductor Corporation for \$10.4 billion.²⁸⁸ In a September 2020 internal presentation, on the slide entitled “FQ2 2020: Bookings Waterfall,” Arm identifies [REDACTED]

[REDACTED] which indicates that [REDACTED]

123. As summarized above, Arm consents, novates, and in certain instances, receives a fee for such novation. These types of transactions occur in the normal course of Arm’s business and do not result in the purported harm that Arm has alleged and that Mr. Schoettelkotte opines on in his report.

G. Mr. Schoettelkotte’s explanations as to why damages are inadequate to compensate for harm and/or cannot be determined with reasonable certainty are flawed and inconsistent

124. Mr. Schoettelkotte concludes that if Qualcomm is not ordered to “discontinue the use and distribution of Arm Technology, Arm Confidential Information, and any products embodying such technology or information (including the Nuvia-based cores), then monetary damages are not adequate to compensate Arm for the harm (including future harm) caused by Defendants’ breach of the Nuvia ALA” and “the monetary damages associated with the harm to Arm (including future harm) caused by Defendants’ breach of the Nuvia ALA cannot be

²⁸⁷ ARM_01426109-156 at ‘155.

²⁸⁸ S&P Capital IQ, Infineon Technologies AG Transaction Details, Merger/Acquisition: Cypress Semiconductor Corporation; ARM_00095791, tab “Novations and CoC.”

²⁸⁹ ARM_01311070-084 at ‘081.

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determined with reasonable certainty.”²⁹⁰ However, Mr. Schoettelkotte does not provide any independent analysis as to why monetary damages for the claims Arm makes in this litigation cannot be determined with reasonable certainty, or why damages cannot adequately compensate Arm for its claimed harms. For example, as discussed above, Arm’s pleadings state that Arm was harmed because Qualcomm purportedly gained a head start in developing its custom cores.²⁹¹ Also as discussed above, intellectual property disputes frequently include head start damages claims, and the damages methodology for determining head start damages is well established. In my opinion, Arm’s damages, in the event it proves its claim, could have been calculated in this matter, as explained above. However, Mr. Schoettelkotte does not begin to attempt to quantify Arm’s damages. Instead, Mr. Schoettelkotte’s report recites a number of purported harms for which the primary bases identified by Mr. Schoettelkotte are the testimony of and conversations with Arm personnel.

125. Mr. Schoettelkotte in places relies on deposition testimony to support his opinions, but he provides an incomplete characterization of the testimony. A more fulsome reading of the deposition testimony includes testimony that directly contradicts the presence of harm. In certain instances, a deponent is unaware of the harm suggested by Mr. Schoettelkotte, does not have direct evidence of such harm, and/or admits that the presence of harm is based on the witness’s “conjecture.”²⁹²

126. In support of some claimed harms, Mr. Schoettelkotte points to reported risk factors found in Arm’s public filings with the SEC, but the reported risks factors exist in Arm business model even without Qualcomm’s alleged actions. According to the SEC, in general, reported business risks in a company’s SEC filings “may be true for the entire economy, some

²⁹⁰ Schoettelkotte Report, p. 32.

²⁹¹ Complaint, p. 10.

²⁹² Deposition of Will Abbey, October 27, 2023, p. 365.

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may apply only to the company's industry sector or geographic region, and some may be unique to the company."²⁹³ Mr. Schoettelkotte conflates Arm's systematic and idiosyncratic risks with risks purportedly associated only with Qualcomm's alleged actions. However, many of Arm's purported harms exist simply due to the nature of Arm's business, and Mr. Schoettelkotte has not differentiated the harms purportedly due to Defendants' alleged wrongful conduct from harms that are due to the nature of Arm's inherent business risks.

127. Further, Mr. Schoettelkotte appears to assume that, if Qualcomm had not allegedly breached the contract at issue, other events would not have occurred, even though the events are unrelated to Arm's claims. For example, as discussed below, Mr. Schoettelkotte appears to assume in his but-for world that: (1) Qualcomm would not have acquired Nuvia, (2) Arm would somehow have control over Qualcomm's business decisions, such as when and in which market segments to make investments in new technology, and (3) Qualcomm would not have been able to develop its own custom CPU under the Arm / Qualcomm ALA.

128. Further, Mr. Schoettelkotte frequently states that purported harms and future events "may occur" or "could occur" without providing any expert opinion regarding the probability or likelihood that these events will actually occur. Absent such analysis, Mr. Schoettelkotte is identifying possibilities as opposed to events that can be assumed to occur with a reasonable degree of certainty, and as such would support calculation of future damages.

129. In the following sections, I address specific flaws and issues found in each section of the Schoettelkotte Report in which Mr. Schoettelkotte purports to explain why "[d]amages [are] inadequate to compensate for harm."²⁹⁴

²⁹³ <<https://www.sec.gov/files/reada10k.pdf>>.

²⁹⁴ See Schoettelkotte Report, pp. 32-66.

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i. Mr. Schoettelkotte's claim that there will be "significant disruption to Arm's licensing ecosystem" lacks sufficient analytical foundation or independent analysis

130. Mr. Schoettelkotte opines that "the disruption to Arm's licensing ecosystem includes many different, but overlapping, harms which cannot be quantified"²⁹⁵ and identifies five purported harms to Arm's licensing ecosystem as a result of the Defendants' breach of the Arm / Nuvia ALA: (1) "existing and prospective Arm licensees could demand more favorable terms and lower royalties to account for increased risk;" (2) "existing and prospective Arm licensees could exploit development and financial terms of other licenses in unexpected ways to compete against Arm's partners;" (3) "Arm will not be able to rely on partners respecting provisions in its existing and prospective licenses to protect its intellectual property;" (4) "third parties and end users may shift to Nuvia-based cores;" and (5) "existing and prospective licensees may shift away from Arm chips."²⁹⁶ I address each of these five purported harms individually in the sections below.

a. Mr. Schoettelkotte provides no support for his opinion that "existing and prospective Arm licensees could demand more favorable terms and lower royalties to account for increased risk"

(i) Mr. Schoettelkotte cites to no evidence that Arm licensees have demanded more favorable terms or lower royalties as a result of Defendants' alleged breach

131. Mr. Schoettelkotte opines that Arm faces "harm of existing and prospective Arm licensees demanding more favorable license terms and lower royalties to account for increased risk associated with other licensees' misuse of Arm's intellectual property resulting from Defendants' breach of the Nuvia ALA" and that harm "cannot be readily quantified and the associated monetary damages cannot be reasonably ascertained."²⁹⁷ The fundamental problem

²⁹⁵ Schoettelkotte Report, p. 33.

²⁹⁶ Schoettelkotte Report, pp. 34-35.

²⁹⁷ Schoettelkotte Report, p. 35.

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with Mr. Schoettelkotte's opinion that licensees "could demand more favorable terms" is that it is replete with vague inferences, illogical conclusions, and no support tying the purported harm to Defendants' alleged breach or alleged wrongful conduct.

132. As a starting point, Mr. Schoettelkotte's report provides no analytical foundation, supporting documents, or independent opinions substantiating a tie between ill-defined demands by licensees for "more favorable terms" and purported "increased risk" from "misuse" of Arm's intellectual property by "other licensees" (apparently other than Qualcomm), that is the result of Defendants' alleged breach in this litigation.²⁹⁸

133. Mr. Schoettelkotte states that current and prospective licensees "could consider" Qualcomm, other licensees, or prospective licensees breaching their license agreements and misusing Arm's intellectual property.²⁹⁹ It appears that Mr. Schoettelkotte is claiming harm from actual and prospective licensees "considering" not just Qualcomm's alleged behavior, but other unspecified licensees' or prospective licensees' breaches of their respective license agreements.³⁰⁰ However, Mr. Schoettelkotte provides no evidence or support that this ever occurred.

134. It further appears that he states that the actual and prospective licensees' consideration of this behavior "could have several impacts" including that they "may be less inclined" to "respect" their license terms or that they could "selectively misinterpret terms."³⁰¹ Again, Mr. Schoettelkotte provides no evidence or support that this ever occurred.

135. Mr. Schoettelkotte appears to translate this purported lack of respect and selective misinterpretation of license terms into financial harm in the form of "transaction costs associated

²⁹⁸ Schoettelkotte Report, p. 35.

²⁹⁹ Schoettelkotte Report, p. 35.

³⁰⁰ Assuming that a prospective licensee could breach a license agreement is illogical. There is no basis to assume an agreement could be breached if the licensee is only a prospective licensee, as there is no license agreement to breach.

³⁰¹ Schoettelkotte Report, p. 35.

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with probable re-negotiations and other related effects.”³⁰² However, Mr. Schoettelkotte does not identify any situation in which licensees sought reduced royalties, nor does he identify specific transaction costs, attempt to calculate the alleged costs, or explain how these transaction costs are related to Defendants’ alleged wrongful conduct in this matter.

136. Mr. Schoettelkotte also summarily states that existing and prospective licensees “may seek” reduced royalties or other concessions, and that damages associated with reduced royalty rates cannot be determined without any explanation for why reduced royalty rates could not be quantified.³⁰³ Royalty rates are inherently quantifiable, as demonstrated by Arm’s application of different royalty rates for different markets in the calculations it prepared as part of its negotiations with Qualcomm, discussed above. If reduced royalty rates cannot be determined, it is because the premise of Mr. Schoettelkotte’s claim of “probable renegotiations” beyond those that occur in the normal course of business lacks sufficient foundation or independent analysis tying the claims back to Defendants’ alleged wrongful conduct.

137. I do not provide any liability opinions in this matter, and I am not making any factual determinations. However, my opinion as a damages expert is that the alleged harm recited by Mr. Schoettelkotte is ill-defined and lacks a sufficient basis for a damages opinion. I reserve my right to respond to these opinions if more information becomes available. Notwithstanding, I have the following observations regarding the support that Mr. Schoettelkotte does include in his report.

(ii) License agreement renegotiations and requests for lower royalty rates occur in Arm’s normal course of business

138. Mr. Schoettelkotte fails to distinguish existing and prospective licensees’ possible demand for lower royalties that could occur in the normal course of business, versus the demand for “more favorable terms” that he identifies as purported harm to Arm.

³⁰² Schoettelkotte Report, p. 35.

³⁰³ Schoettelkotte Report, p. 36.

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139. Arm's public disclosures state that renegotiations and/or requests of reduced royalty rates occur in the normal course of Arm's business. For example, Arm identifies this activity as a risk factor in acquisitions, stating in its SEC filing and it states:³⁰⁴

...in the past, some of our larger customers who have negotiated lower pricing models have acquired customers with higher pricing models. **In some cases, we have been, and in the future may be, required to renegotiate the pricing model with the acquired company or to honor the lower pricing model applicable for the acquiring customer while providing the same products prior to the acquisition by the larger company.** (Emphasis added.)

140. In connection with the proposed merger between Arm and Nvidia, Arm submitted comments to United Kingdom's Competition and Markets Authority ("CMA") in July 2021, shortly after Qualcomm's acquisition of Nuvia, where Arm states:

The CMA's concerns as regards the inherent limitations of contractual protections apply equally in respect of partial foreclosure. **Contractual terms including royalty levels can be re-negotiated,** and some aspects of a competitive offering cannot be fully specified in a contract... (Emphasis added)³⁰⁵

The Merged Entity will be constrained by Arm's licensees', OEMs' and CSPs' buyer power, as these are all sophisticated customers that would not tolerate a restriction of choice and would switch to alternative solutions. **The Parties submitted that 'powerful' licensees such as [] have been able to negotiate favourable terms in their negotiations with Arm.** (Emphasis added and internal citations omitted)³⁰⁶

³⁰⁴ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 27.

³⁰⁵ Nvidia-Arm, A report to the Secretary of State for Digital, Culture, Media & Sport on the anticipated acquisition by NVIDIA Corporation of Arm Limited, July 20, 2021, p. 47.

³⁰⁶ Nvidia-Arm, A report to the Secretary of State for Digital, Culture, Media & Sport on the anticipated acquisition by NVIDIA Corporation of Arm Limited, July 20, 2021, p. 43.

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141. Arm also submitted commentary to the United States Federal Trade Commission (“FTC”), where Arm states that:³⁰⁷

Once the parties sign a licensing agreement, there are typically no further negotiations. **Occasionally, Arm receives re-negotiation requests.** These usually concern reduction in royalty rates where market conditions have changed, and profit margins of the specific customer have lowered to a point where the original royalty structure may need to be revisited to make the customer’s product commercially viable.” (Emphasis added)

142. Based on Arm’s own submissions to the SEC, CMA, and FTC, it is evident that Arm encounters attempts by licensees to renegotiate the terms of the existing license agreements in the normal course of business, and such activity occurs separately from Defendants’ alleged actions. Mr. Schoettelkotte’s report does not address the extent to which his assertion that “existing and prospective Arm licensees could demand more favorable terms and lower royalties to account for increased risk” is the result of factors different from licensee demands in the normal course of business.³⁰⁸

(iii) Mr. Abbey and Mr. Williamson provided Mr. Schoettelkotte with information in interviews that contradicts their deposition testimony and the deposition testimony of other Arm personnel

143. As described above, Mr. Schoettelkotte states that existing licensees “may be less inclined to respect their license terms or selectively misinterpret terms which would require Arm to devote significant resources to negotiating and, potentially, enforcing those licenses” because of other licensees’ breaches.³⁰⁹ Mr. Schoettelkotte relies on discussions with Mr. Abbey and Mr. Williamson as support for this opinion. However, at their depositions, Mr. Abbey and Mr.

³⁰⁷ ARM_01226630-706 at ‘648.

³⁰⁸ Schoettelkotte Report, p. 35.

³⁰⁹ Schoettelkotte Report, p. 35.

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Williamson stated that [REDACTED]

[REDACTED]

144. For example, Mr. Abbey testified that [REDACTED]

[REDACTED] Mr. Williamson testified that he is [REDACTED]

[REDACTED] Consistent with Mr. Abbey and Mr. Williamson's testimony, Mr. Haas testified, "we had never had a customer ignore our contracts blatantly."³¹² Mr. Haas further testified that Arm had suffered no concrete harm yet.³¹³ Therefore, Arm's deponents testified that [REDACTED]

illustrating that the premise for Mr. Schoettelkotte's opinion is not supported by Arm's testimony.

(iv) Mr. Schoettelkotte claims that there are "transaction costs associated with probable re-negotiations," but the cited deposition testimony does not support this claim.

145. Mr. Schoettelkotte states that "transaction costs associated with probable re-negotiations and other related effects could result in significant harm to Arm's licensing ecosystem."³¹⁴ Mr. Schoettelkotte states that a renegotiation will likely occur and there will be transaction costs associated with it. Aside from discussions with Mr. Abbey and Mr. Williamson, Mr. Schoettelkotte cites to deposition testimony, but this testimony does not support his claims whatsoever.

146. Specifically, Mr. Schoettelkotte cites to the following deposition testimony of Mr. Abbey regarding [REDACTED]

³¹⁰ Deposition of Will Abbey, October 27, 2023, p. 366.

³¹¹ Deposition of Paul Williamson, November 9, 2023, p. 244.

³¹² Deposition of Rene Haas, December 12, 2023, p. 165.

³¹³ Deposition of Rene Haas, December 12, 2023, pp. 165-166.

³¹⁴ Schoettelkotte Report, pp. 35-36.

³¹⁵ Schoettelkotte Report, p. 36; Deposition of Will Abbey, October 27, 2023, p. 365.

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[REDACTED]

147. However, Mr. Abbey's testimony does not discuss or relate to any re-negotiation efforts at all, or any costs associated with those re-negotiation efforts. Similarly, Mr. Schoettelkotte points to Mr. Herbert's testimony [REDACTED]

[REDACTED] Again, this testimony does not relate to any re-negotiation efforts undertaken by Arm, nor any transaction costs associated with any re-negotiation. Finally, Mr. Schoettelkotte cites to Mr. Segars' testimony that [REDACTED]

[REDACTED]³¹⁷ Mr. Segars' testimony again does not relate to any re-negotiation of license terms, nor any transaction costs associated with re-negotiations. None of the deposition testimony cited by Mr. Schoettelkotte supports his assertion that re-negotiations of licenses will be probable, nor that the transaction costs associated with these purported re-negotiations could "result in significant harm to Arm's licensing ecosystem."³¹⁸

b. Mr. Schoettelkotte provides no support for his conclusion that "existing and prospective Arm licensees could exploit development and financial terms of other licenses in unexpected ways to compete against Arm's partners"

148. As a threshold matter, Mr. Schoettelkotte claims that there is harm from "existing and prospective Arm licensees exploiting the technology developed under, and the financial terms of, other Arm licensees in unexpected ways," but it is unclear exactly what behavior (i.e., what

³¹⁶ Schoettelkotte Report, p. 36; Deposition of Tim Herbert, October 25, 2023, p. 121.

³¹⁷ Schoettelkotte Report, p. 36; Deposition of Simon Segars, November 16, 2023, p. 83.

³¹⁸ Schoettelkotte Report, p. 36.

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kind of exploitation) Mr. Schoettelkotte is referring to as harmful. This opinion is problematic in that it appears to be based on “unexpected harm,” but he does not define what he means by unexpected. Mr. Schoettelkotte gives a few examples of what he appears to mean by this opinion, but these examples do not hold up to scrutiny.

149. For example, Mr. Schoettelkotte asserts that Arm licenses will become “tradable commodities” but provides no explanation of what he means by “tradable commodities.”³¹⁹ These conclusions directly cite conversations with Arm as the only support, and Mr. Schoettelkotte provides no additional explanation, analysis or other documents in support of his claim that Arm may lose control of its licensing ecosystem and have its agreements become “tradable commodities.” Mr. Schoettelkotte further cites conversations with Arm that led him to the conclusion that Arm may be deprived of the opportunity to “partner with *new companies* in industries and markets that have *not yet emerged*.”³²⁰ Yet he does not provide any independent support that Arm is at risk of losing any such opportunities, nor does he identify any new companies or emerging markets where this is a risk. These statements are vague, and lack any independent support, explanation, or supporting analysis tying the claimed harm back to Qualcomm’s alleged actions in this case.

150. Mr. Schoettelkotte describes a potential “free ride” in which “other companies” may follow “this precedent” of Qualcomm being permitted to continue to use Arm intellectual property embodied in the Nuvia cores, and Mr. Schoettelkotte concludes that this could somehow cause a “loss of control” of Arm’s licensing ecosystem.³²¹

³¹⁹ Schoettelkotte Report, pp. 36-37.

³²⁰ Schoettelkotte Report, pp. 36-37. Emphasis added.

³²¹ Schoettelkotte Report, pp. 36-37.

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151. This opinion, like many of Mr. Schoettelkotte's other opinions, appears to be a recitation of information provided to him in conversations with Arm personnel, and Mr. Schoettelkotte provides no independent analysis related to these asserted harms.

152. Mr. Schoettelkotte fails to address the fact that both Qualcomm and Nuvia have licenses with Arm independently. Therefore, it is unclear how Arm is "losing control" of its licensing ecosystem because Qualcomm is still an Arm licensee. He fails to provide any support for the claim that Arm will suffer these broad and generalized harms to its licensing ecosystem or ability to control its intellectual property when both Qualcomm and Nuvia are both Arm ALA licensees. Mr. Schoettelkotte provides no independent analysis or basis for claims regarding how he thinks actual and prospective licensees would interpret and react to this dispute if Arm received monetary compensation from this litigation as opposed to the return or destruction of what Arm claims to be its intellectual property being allegedly improperly used by Qualcomm.

153. Mr. Schoettelkotte also states that Arm would effectively lose control of its intellectual property and licensing ecosystem if "Qualcomm could acquire Nuvia, repurpose Nuvia's development work under the ALA for a different purpose, and then commercialize that work under Qualcomm's own lower royalty rates."³²² Mr. Schoettelkotte further opines that if an acquirer could circumvent the negotiated pre-acquisition royalty rates and pay the acquirer's differently negotiated royalty rates as opposed to the acquired company's rates, then Arm would be at risk.³²³

154. Mr. Schoettelkotte provides no basis or economic rationale for his assertion that the application of an acquirer's negotiated royalty rates to products that the acquirer completed and commercialized (from work that was started at but was not completed by the acquired company) represents circumvention. Further, Mr. Schoettelkotte provides no justification or

³²² Schoettelkotte Report, p. 39.

³²³ Schoettelkotte Report, pp. 37-38.

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economic rationale for his claim that honoring the royalty rates from one Arm licensee acquiring another Arm licensee results in an “unfair advantage.”³²⁴ Mr. Schoettelkotte opines that the purported harm results in an unfair advantage as acquirers would have a lower royalty rate than other Arm licensees.³²⁵ However, Mr. Schoettelkotte provides no economic rationale for claiming Arm has been damaged if the royalty rates being applied post-acquisition are royalty rates that were agreed to by Arm and the acquiring licensee.

155. As part of his support for this section, Mr. Schoettelkotte asserts that “Arm does not intend or expect, and Arm licensees do not pay for, the right to acquire and use products developed by other licensees under other license agreements with other technical and financial terms (and that may have been negotiated with different downstream products in mind).”³²⁶ Again, Mr. Schoettelkotte cites to only discussions with Arm personnel as support. He does not cite any independent corroborating evidence or conduct any independent analysis to verify that claim. However, documents produced in this litigation appear to contradict Mr. Schoettelkotte’s unsupported assertions.

156. While counsel has informed me that the parties are contesting redactions to Arm’s other ALA agreements and whether certain other Arm ALAs should be produced at all, at least one of those agreements [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]³²⁷ I understand that Ampere has represented that this language “[REDACTED]

[REDACTED]

[REDACTED]

³²⁴ Schoettelkotte Report, p. 37.

³²⁵ Schoettelkotte Report, p. 37.

³²⁶ Schoettelkotte Report, p. 37.

³²⁷ ARM_01245720-726 at ‘723-‘724, ‘726.

discussed above, Mr. Schoettelkotte's conclusion that acquisitions involving the use of an Arm licensee's developed technology by an acquiring company is somehow novel is an opinion that appears to be contradicted by Arm's own agreements.

158. Moreover, Arm already specifically quantified the compensation it sought from Qualcomm for a “design transfer” as part of commercial negotiations with Qualcomm. As described in Mr. Schoettelkotte’s report, Arm negotiates different royalty rates for different companies and downstream markets. Arm’s calculations of the compensation it sought from Qualcomm included analyses of different royalty rates for different markets and for Qualcomm and Nuvia. Mr. Schoettelkotte fails to consider the relevance of those calculations to what he

³²⁹ Schoettelkotte Report, p. 38.

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calls “commandeering” in this section of his report. As described above, [REDACTED]

[REDACTED]

[REDACTED]

159. Mr. Schoettelkotte appears to opine that Arm has been or will be harmed because it cannot exert a role of enforcing royalty rates.³³⁰ Mr. Schoettelkotte appears to attribute this harm to Qualcomm and the actions that followed the Nuvia acquisition. However, Arm’s SEC filings disclose this as a risk factor, do not describe the circumstance as wrongful conduct, and do not identify Qualcomm as the cause of some harm. Arm states:³³¹

For example, in the past, some of our larger customers who have negotiated lower pricing models have acquired customers with higher pricing models. In some cases, we have been, and in the future may be, required to renegotiate the pricing model with the acquired company or to honor the lower pricing model applicable for the acquiring customer while providing the same products prior to the acquisition by the larger company.

160. Despite Mr. Schoettelkotte’s claims of purported harm, it is evident that Arm licensees acquire other Arm licensees, and, at least according to its SEC filings, Arm has been or may be in the future required to “honor the lower pricing model applicable to the” acquirer. Arm therefore understood that one licensee acquiring another may change the licensee’s pricing to its detriment. As Mr. Williamson recognized, doing an [REDACTED]

[REDACTED] Mr. Schoettelkotte’s opinions fail to differentiate between activity and business risks that occur in the normal course of Arm’s business and what he claims is wrongful conduct by Defendants.

³³⁰ Schoettelkotte Report, p. 39.

³³¹ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 27.

³³² ARM_01241616-20 at ‘616.

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c. Mr. Schoettelkotte wrongly opines that Arm's licensing ecosystem is harmed because "Arm will not be able to rely on partners respecting provisions in its existing and prospective licenses to protect its intellectual property"

161. Mr. Schoettelkotte opines that there is harm from "Arm not being able to rely on partners and prospective partners respecting provisions in its existing and prospective licenses..."³³³ His preceding statements rely on testimony and conversations with Mr. Abbey and Mr. Williamson,³³⁴ however, the Arm testimony does not support the existence or likelihood of such a harm to date.

162. For example, Mr. Abbey testified that [REDACTED]
[REDACTED] Mr. Williamson testified that he is [REDACTED]
[REDACTED]³³⁶ Consistent with Mr. Abbey and Mr. Williamson's testimony, Mr. Haas testified that when the complaint was filed, "we had never had a customer ignore our contracts blatantly."³³⁷

d. Mr. Schoettelkotte has no basis to claim Arm is harmed because "third parties and end users may shift to Nuvia-based cores"***(i) Mr. Schoettelkotte attributes harm to Arm that is the normal consequence of Arm granting ALAs to licensees***

163. Mr. Schoettelkotte claims that harm from "third parties and end users shifting to Nuvia-based Cores and products incorporating Nuvia-based Cores as a result of Defendants' breach of the Nuvia ALA cannot be readily quantified."³³⁸ Mr. Schoettelkotte's opinion that Arm is harmed by a shift to Nuvia-based cores appears to be premised on the assumption that

³³³ Schoettelkotte Report, p. 40.

³³⁴ Schoettelkotte Report, pp. 39-40.

³³⁵ Deposition of Will Abbey, October 27, 2023, p. 366.

³³⁶ Deposition of Paul Williamson, November 9, 2023, p. 244.

³³⁷ Deposition of Rene Haas, December 12, 2023, p. 165.

³³⁸ Schoettelkotte Report, pp. 39-41.

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Qualcomm could not develop its own custom core under the Arm / Qualcomm ALA. That assumption is illogical and inconsistent with the premise of an ALA—that the licensee can develop its own custom cores. The fact that Arm granted Qualcomm an ALA with specific royalties set forth therein illustrates that Arm was aware of, and approved of, the possibility that Qualcomm would develop custom cores.

164. Moreover, it is my understanding that Arm is not claiming it can prevent Qualcomm from developing custom CPUs under the Arm / Qualcomm ALA. In fact, I understand that Arm

[REDACTED]

[REDACTED]³³⁹ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] As discussed above, contrary to Mr. Schoettelkotte's opinions, an end user's "shift to Nuvia-based cores" can be a positive business development for Arm, particularly when that shift is from x86 cores.

165. Further, as noted by Mr. Schoettelkotte, Arm's public filings indicate that licensees producing custom cores is a normal business risk associated with granting rights to Arm's intellectual property under an ALA. Arm also discloses this competition between its off-the-shelf CPUs licensed under a TLA and custom CPUs developed under its licensees' ALAs in regulatory

³³⁹ <<https://www.wired.com/story/apples-new-macbook-pro-chips-flex-power-custom-silicon/>>;

³⁴⁰

³⁴¹

³⁴²

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disclosures to the CMA and SEC. For example, in a response to the CMA, Arm states that “the existence of architectural licenses creates pressure on Arm to ... compete with designs from powerful semiconductor giants with larger R&D budgets.”³⁴³ Under the “Risks Relating to Our Business and Industry” section in its Form F-1, Arm states that “customers may decide to license our architecture and develop their own processors based on our architecture, rather than utilize our processor products pursuant to an implementation license.”³⁴⁴ This competitive environment is not a purported harm, but rather a general business risk that exists within Arm’s business model, including granting rights under ALAs to Qualcomm and to other manufacturers.

166. Mr. Schoettelkotte opines that “Qualcomm may be able to sell Nuvia-based Cores and products incorporating Nuvia-based Cores at a lower price point than it would cost an existing or prospective licensee to develop chips under their own TLA or ALA.”³⁴⁵ He also states that “...in tandem with the performance increases related to Nuvia-based Cores, Qualcomm intends to benefit from lower royalty rates to Arm.”³⁴⁶ Mr. Schoettelkotte fails to consider that Arm explicitly enters into ALAs with certain licensees, including Qualcomm, and that these ALAs have lower royalty rates than TLAs. I understand the purpose of an ALA is for a company to develop its own core and then compete on the market with other companies that have developed their own custom core under an ALA, as well as to compete with companies using Arm-developed cores through a TLA. Mr. Schoettelkotte fails to explain why this market activity, which Arm approved by entering into ALAs, is somehow wrongful.

167. Further, Qualcomm and other companies with an ALA develop their own custom cores through substantial expenditures including their own research and development. Whether or not a custom core can be sold at a lower price point depends, in part, on how much the

³⁴³ ARM_00088656-684 at ‘663, ‘666.

³⁴⁴ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 13.

³⁴⁵ Schoettelkotte Report, p. 41.

³⁴⁶ Schoettelkotte Report, p. 41.

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company spends on its own research and development to build a custom core under an ALA. Mr. Schoettelkotte has not performed any such analysis of this additional cost and effort that would influence the price at which Qualcomm could sell its custom CPUs. Mr. Grisenthwaite has testified instead that he believed it may have been cheaper for a company to purchase an implementation license, rather than undergo the effort to create a custom core.³⁴⁷

168. Mr. Schoettelkotte also fails to distinguish where the customers that will shift to Nuvia-based cores would come from. That overlooked distinction is important in determining whether or not this would cause harm to Arm. If the shift to Qualcomm's custom cores is coming from x86 or other non-Arm technology, due to Qualcomm's success in developing custom cores such as the Snapdragon X Elite, then the shift into the PC ecosystem with Qualcomm custom CPUs will benefit Arm, not cause it harm, because Arm will get the benefit of royalties on sales of products to customers that did not previously buy Arm-compliant products. Further, shifts between Arm's ALA licensees, as opposed to a shift from a TLA licensee, would not necessarily cause Arm any harm.

(ii) Arm is capable of quantifying the impact of customers switching to Qualcomm custom cores

169. Notwithstanding the above, Arm contemporaneously created documents that purported to show the impact of royalty income shifting from Arm off-the-shelf CPUs licensed under the Arm / Qualcomm TLA to Qualcomm custom CPUs developed under the Arm / Qualcomm ALA, as discussed in Section VI.E. However, Mr. Schoettelkotte does not reference these analyses in his report. While these calculations were created in relation to a commercial negotiation and are therefore created from Arm's perspective, the documents show that quantification of Arm's purported harm is possible.

³⁴⁷ Deposition of Richard Grisenthwaite, November 15, 2023, pp. 42-44.

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170. For example, in a June 2021 email among Arm personnel, Shultz Wang, Senior Marketing Manager at Arm,³⁴⁸ [REDACTED]

[REDACTED] In an October 2021 message exchange between Arm personnel, Mr. Shivashankar [REDACTED]

[REDACTED] Although the document is difficult to read, it demonstrates that Arm contemplated different scenarios as it states that there's a [REDACTED]

171. While Mr. Schoettelkotte ignores these contemporaneous documents, it is evident that Arm routinely prepared long-term royalty forecasts and measured the financial impact from shifting purchases between Arm-licensed products under ALAs and TLAs in various markets. These calculations illustrate that any purported harm due to any shift to custom cores is quantifiable.

e. Mr. Schoettelkotte's opinion that Arm will be harmed because "existing and prospective licensees may shift away from Arm's chips" to RISC-V and x86 chips is unsupported and illogical

(i) The purported harm is not tied to Qualcomm's alleged actions

172. Mr. Schoettelkotte claims that "the harm associated with existing and prospective Arm licensees shifting away from Arm chips altogether as a result of Defendants' breach of Nuvia ALA cannot be readily quantified..."³⁵² However, Mr. Schoettelkotte does not provide any rationale as to how Qualcomm's custom CPU "may" lead licensees to shift away from Arm-based products entirely. This opinion is unsupported and illogical.

³⁴⁸ <<https://www.linkedin.com/in/shultzwang/>>

³⁴⁹ ARM_00120302-303 at '303.

³⁵⁰ ARM_01292866; ARM_01292867-917.

³⁵¹ ARM_01292867-917 at '889.

³⁵² Schoettelkotte Report, p. 43.

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173. Mr. Schoettelkotte attempts to support this opinion by arguing that “if Arm’s investments in research and development were to be impacted due to a decline in revenue, existing and prospective licensees may perceive Arm as not being an industry leader in performance and support.”³⁵³ The premise of his opinion appears to be that Qualcomm’s allegedly wrongful actions will reduce Arm’s revenue, and that reduction will be material enough to impact Arm’s research and development expenditure, and that reduction will be material enough that licensees will “perceive” that Arm is not an industry leader in performance and support, and, finally, this loss in perceived leadership will cause licensees to switch to an entirely different instruction set architecture such as x86, or the developmental and unproven RISC-V architecture.³⁵⁴ Mr. Schoettelkotte provides no independent analysis or basis for making these analytical leaps. His asserted connection between Qualcomm’s alleged actions in this case and potential increased competition from RISC-V lacks any objective support. He relies on conversations with Mr. Abbey and Mr. Williamson, but again, he does not conduct any analysis or provide any rationale of how Qualcomm’s alleged actions result in a shift away from Arm CPUs entirely to new architectures and how this purported shift is not the product of events that are wholly unrelated to Defendants’ alleged wrongful conduct.

(ii) Customers adopted RISC-V for reasons unrelated to Qualcomm’s alleged actions

174. Mr. Schoettelkotte identifies RISC-V as a potential alternative to Arm that “existing and prospective licensees might consider.”³⁵⁵ Though, in the same paragraph, Mr. Schoettelkotte contradicts himself by stating that “the threat of RISC-V is considered to be low because RISC-V

³⁵³ Schoettelkotte Report, p. 43.

³⁵⁴ Schoettelkotte Report, p. 43.

³⁵⁵ Schoettelkotte Report, p. 43.

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is immature compared to Arm and doesn't have the same level of support" and "RISC-V doesn't pose a major threat to Arm."³⁵⁶

175. Notwithstanding, Mr. Schoettelkotte does not explain how Qualcomm's alleged actions influence other licensees and market participants to shift away from Arm-based CPUs to RISC-V-based CPUs. Prior to Qualcomm's alleged actions, RISC-V already had a presence in the marketplace and some Arm customers and licensees adopted this technology. For example, in an October 2020 Arm presentation on a slide entitled "[REDACTED]" Arm identifies [REDACTED]

[REDACTED] the same presentation on a slide entitled [REDACTED] Arm states that [REDACTED]

[REDACTED]³⁵⁸ Arm acknowledged that it had to address the "[REDACTED]" [REDACTED]³⁵⁹ This document demonstrates that activities relating to the adoption of RISC-V among Arm's customers pre-existed the alleged wrongful conduct of Defendants in this matter.

176. Further, Mr. Schoettelkotte provides no basis for asserting that competition from RISC-V "may increase" as a result of Defendants' alleged actions. In a March 2023 Project Atom RISC-V Discussion Topics document, Arm states that [REDACTED]

[REDACTED] Arm also notes that [REDACTED]

³⁵⁶ Schoettelkotte Report, p. 43.

³⁵⁷ ARM_01282466-575 at '488.

³⁵⁸ ARM_01282466-575 at '485.

³⁵⁹ ARM_01282466-575 at '485.

³⁶⁰ ARM_00120530-536 at '530.

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[REDACTED]

[REDACTED]³⁶¹ Further, Arm states that “[REDACTED]

[REDACTED]³⁶² Again, this document demonstrates that activities unrelated to Qualcomm’s alleged actions led to the adoption of RISC-V among Arm’s customers.

ii. Mr. Schoettelkotte does not link Arm’s purported loss of its first mover advantage to any claims against Defendants

177. Mr. Schoettelkotte opines that Defendants’ breach of the Nuvia ALA will negatively impact Arm’s first mover advantage, and that this harm “cannot be readily quantified and the associated monetary damages cannot be reasonably ascertained. Arm’s loss of first mover advantage could cause significant detrimental effects, including a loss of ecosystem benefits and the ability of Arm to establish a foothold in emerging markets as potential licensees seek alternatives to Arm-based technology.”³⁶³

178. It is unclear what Mr. Schoettelkotte means by a “first mover advantage,” what the benefits of Arm’s mover advantage are, which markets he purports to apply it to, and the basis for Mr. Schoettelkotte’s opinion that Qualcomm has denied Arm any of these purported benefits through Qualcomm’s alleged its alleged wrongful conduct. Nor has Mr. Schoettelkotte provided any support showing that Arm in fact has a first mover advantage, however defined.

³⁶¹ ARM_00120530-536 at ‘532.

³⁶² ARM_00120530-536 at ‘530.

³⁶³ Schoettelkotte Report, p. 45.

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a. Mr. Schoettelkotte claims that Qualcomm's acquisition of Nuvia provided Qualcomm with an "accelerated path to developing its own CPUs," but he fails to link this accelerated path to any alleged wrongful conduct

179. Mr. Schoettelkotte describes accelerated development achieved by Qualcomm from Qualcomm's acquisition of Nuvia. Mr. Schoettelkotte opines that "[b]y acquiring Nuvia, Qualcomm gained an advantage by way of an accelerated path to developing its own CPUs, which will come at the expense of Arm's other licensees."³⁶⁴ He does not cite any other basis. That is, the testimony that he cites describes an advantage gained by Qualcomm through rapid acquisition of a "world class team" including a "core set of leadership" from a very small set of qualified talent.³⁶⁵ I am not aware of any claims by Arm that it could prevent Qualcomm from acquiring Nuvia or hiring any of its engineers.

b. Arm licensees leverage Arm's "presence in the market"

180. Mr. Schoettelkotte opines that "[t]hrough its actions, Qualcomm appears intent on leveraging Arm's presence in the market and ecosystem to replace CPUs developed under Arm TLAs with Nuvia-based Cores. As discussed previously in this report, a harm that may result to Arm is third parties and end users shifting to Nuvia-based cores. By foregoing its own development efforts (and related costs), Qualcomm appears poised to use the Nuvia-based Cores at the direct expense of Arm and its established first mover advantage. This advantage may not have been realized under Qualcomm's own ALA given that Qualcomm had failed to create its own products under that agreement."³⁶⁶ Mr. Schoettelkotte points to Arm's more than 30-year presence in "the market," Arm's "innovation in the mobile phone revolution," and its intent "to

³⁶⁴ Schoettelkotte Report, p. 48.

³⁶⁵ Schoettelkotte Report, p. 49.

³⁶⁶ Schoettelkotte Report, p. 50.

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expand its presence in new markets” among other things as support for Arm’s presence in the market.³⁶⁷

181. As a threshold matter, Mr. Schoettelkotte does not define what he considers Arm’s “first mover advantage” to be or how Arm purportedly derives benefit from its purported “first mover advantage.” I understand that Arm-compatible CPUs, as components of SoCs, are in close to 100% of smartphones.³⁶⁸ That would not change if Qualcomm released a product with a “Nuvia-based Core,” since it would still be an Arm-compliant CPU for which Arm would receive royalties.

182. Further, Mr. Schoettelkotte’s claim that Qualcomm’s purported intent to replace CPUs developed under Arm TLAs with “Nuvia-based Cores” somehow causes Arm to lose its first-mover advantage is illogical and inconsistent with history. If Arm had a purported “first mover advantage,” it relinquished that position years ago. For example, Qualcomm previously developed and released an Arm-based custom CPU that it developed under its ALA with Arm. In 2005, Qualcomm announced development of the Scorpion custom core.³⁶⁹ Qualcomm successfully incorporated the Scorpion core into a Snapdragon SoC, and by 2009 Qualcomm had a reported smart phone market share of 12%.³⁷⁰ Mr. Schoettelkotte’s claim that “Qualcomm had failed to create its own products under [its ALA] agreement”³⁷¹ is therefore entirely incorrect. Not only had Arm apparently relinquished its “first mover” advantage, but it did so to Qualcomm, and others, under an ALA, many years prior to the Defendants’ alleged wrongful conduct in this matter.

³⁶⁷ Schoettelkotte Report, pp. 45-48.

³⁶⁸ <<https://investors.arm.com/static-files/187d293b-42eb-48b0-b82f-e78bce4da9e4>>.

³⁶⁹ <<https://www.qualcomm.com/news/releases/2005/11/qualcomm-introduces-worlds-most-advanced-mobile-microprocessor>>.

³⁷⁰ <<https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/M29QualcommPDFa.pdf>>.

³⁷¹ Schoettelkotte Report, p. 50.

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183. Arm has entered into ALAs that allow licensees to develop their own custom cores, including a large manufacturer producing products for the mobile market, such as Apple.³⁷² I understand that Apple, for example, has already developed and released an Arm-compliant custom CPU, developed under its ALA with Arm, in its ubiquitous smartphones.³⁷³ Therefore, in the mobile market, Arm ALA licensees have already developed and released custom CPUs that compete with Arm's TLA-based products and other ALA-based products. Therefore, Qualcomm's future introduction of a custom CPU into the mobile market would not interfere with any purported "first-mover" advantage. If that advantage existed, it is already lost. Further, I understand that Mr. Schoettelkotte does not claim Arm has a "first mover advantage" in the PC market, and Arm therefore does not have an advantage to lose in that market.

184. Mr. Schoettelkotte makes vague references to Qualcomm's "intent" to "leverage" Arm's presence in the market and ecosystem to "replace CPUs developed under Arm TLAs with Nuvia-based cores."³⁷⁴ Mr. Schoettelkotte's report provides no basis for asserting that replacing an off-the-shelf Arm core from a TLA agreement with a custom core developed under an ALA agreement is somehow nefarious behavior on Qualcomm's part. As described above, Arm enters into the ALA agreements that enable licensees to replace off-the-shelf Arm TLA CPUs with custom CPUs as a part of its normal course of business. Nor does Mr. Schoettelkotte explain how Qualcomm would "leverage Arm's presence in the market." As Arm's chief architect, Richard Grisenthwaite testified, under Arm's ALAs, it is the *licensees*, like Qualcomm, who build the implementations in the market.³⁷⁵ Relatedly, Mr. Schoettelkotte also ignores that both Arm's

³⁷² ARM_00083356, tab "Royalties Comparison;" ARM_01426109-156 at '134.

³⁷³ <<https://www.cnbc.com/2023/11/09/how-arm-gained-chip-dominance-with-apple-nvidia-amazon-and-qualcomm.html>>.

³⁷⁴ Schoettelkotte Report, p. 50.

³⁷⁵ Deposition of Richard Grisenthwaite, November 15, 2023, p. 36.

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current and past CEOs testified that [REDACTED]

[REDACTED]

c. Arm does not have a first mover advantage in emerging markets

185. Mr. Schoettelkotte opines that “Qualcomm’s actions also jeopardize Arm’s ability to use this advantage to enter and grow its presence in emerging markets.”³⁷⁷ Mr. Schoettelkotte further opines that “Qualcomm’s proposed cost savings from acquiring Nuvia included making sales in emerging markets such as automotive and data centers. Here again, as with the mobile segment, Qualcomm intends to benefit from foregoing its own development efforts (and related costs) to use Nuvia-based Cores to the detriment of Arm’s own decades-long efforts. With fewer licensees, Arm’s ability to broaden into emerging markets will be impacted.”³⁷⁸

186. Mr. Schoettelkotte implies that Arm’s historical success in the mobile segment will translate into success in other emerging markets, but he does not conduct any analysis to support this claim. In fact, Arm informed the FTC that the non-mobile markets will be “difficult to crack” due to Intel’s and AMD’s ecosystem and significant investments:³⁷⁹

Datacenter and PC, two markets that SoftBank targeted with its investments in Arm, are far more difficult to crack. Unlike Arm, the x86 incumbents in datacenter and PC (Intel and AMD) benefit from an established ecosystem of developers, software, systems, and peripherals. They are also vertically integrated, enjoying profits generated from multiple levels of the technology stack, allowing them to make massive R&D investments. As a result, any competitor following an IP-only licensing model, like Arm, is at a major ecosystem and economic disadvantage.

³⁷⁶ Deposition of Simon Segars, November 16, 2023, p. 33. See also Deposition of Rene Haas, December 12, 2023, p. 88.

³⁷⁷ Schoettelkotte Report, p. 50.

³⁷⁸ Schoettelkotte Report, p. 50.

³⁷⁹ ARM_00088656-684 at ‘658.

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187. Mr. Schoettelkotte fails to address the fact that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

³⁸¹ This effort, if successful, will benefit Arm, not harm Arm. In fact, Mr. Haas informed investors that he feels “very, very good about the growth projections for Windows on Arm.”³⁸²

188. [REDACTED]

[REDACTED] Mr. Schoettelkotte ignores this evidence when stating that Arm has been harmed in “emerging markets,” and does not consider the benefit that Arm will receive [REDACTED]

[REDACTED]⁴

iii. Mr. Schoettelkotte’s opinion that “Arm’s expansion into new segments and markets will be undermined” is contradicted

189. Mr. Schoettelkotte claims that Defendants’ alleged breach of the ALA will hinder Arm’s expansion into new market segments, focusing on the server market.³⁸⁵ Specifically, Mr. Schoettelkotte claims that “Nuvia was expected to provide Arm with a foothold in [the server market] where x86 dominates.”³⁸⁶ Mr. Schoettelkotte further states that “Qualcomm’s actions

³⁸⁰ [REDACTED]

³⁸¹ [REDACTED]

³⁸² Arm Holdings plc FQ2 2024 Earnings Call Transcripts, p. 8.

³⁸³ [REDACTED] <<https://mixed-news.com/en/samsung-xr-devices-will-use-google-and-qualcomm-tech/>>; <<https://pc-tablet.com/qualcomm-throws-down-the-gauntlet-snapdragon-xr2-gen-2-challenges-apples-vision-pro-in-mixed-reality-race/>>.

³⁸⁴ Schoettelkotte Report, p. 50.

³⁸⁵ Schoettelkotte Report, p. 51.

³⁸⁶ Schoettelkotte Report, p. 51.

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resulted in the diversion of Nuvia's efforts away from developing a CPU for servers, which have undermined Arm's planned expansion into the segment."³⁸⁷

190. Mr. Schoettelkotte appears to claim that but for Qualcomm's alleged breach, Nuvia's efforts to develop a CPU for servers would have continued. This construction of the but-for world is nonsensical from a damages perspective. Mr. Schoettelkotte's but-for world appears to assume that if Defendants had not allegedly breached, Qualcomm's acquisition of Nuvia would not have occurred, Nuvia would have continued with its server CPU efforts, Nuvia would have been successful, and Arm would therefore have expanded into the server market segment. However, Mr. Schoettelkotte provides no explanation for how the harm he describes is tied to what is claimed as wrongful conduct in this litigation.

191. For example, I understand that Arm makes no claims that it could have prevented Qualcomm's acquisition of Nuvia. I also understand that, once the acquisition occurred, Arm does not claim it could force Qualcomm to pursue the server market before the PC or mobile markets, for example. Specifically, I understand that Arm does not claim that it could prevent Qualcomm from making its independent business decision to shift its focus from the server market to the PC or mobile markets. Mr. Schoettelkotte's but-for world assumes that if Qualcomm destroyed or returned the disputed Arm technology purportedly embodied in Nuvia's chip development, Arm would be back in a position where Nuvia would continue to pursue server CPU development. However, in a properly constructed but-for world, Qualcomm would still acquire Nuvia, and Qualcomm would still be able to make a business decision to prioritize development for whatever market it determined was a priority.

192. Further, Mr. Schoettelkotte states that "while Arm's ALAs and TLAs (including the Nuvia agreements) do not require development in a particular industry or market segment, Arm's

³⁸⁷ Schoettelkotte Report, p. 51.

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execution of them and the specific terms agreed to can be influenced at least in part by Arm's expectation that the licensee will help it gain a foothold in a new industry or market segment, as was the case with Nuvia."³⁸⁸ Mr. Schoettelkotte makes an unsupported analytical leap to suggest that because Arm negotiated royalty rates for the server market with Nuvia, that would somehow guarantee Arm a "foothold in a new industry or market segment."³⁸⁹ As described above, Arm acknowledges in its public filings and reports that its licensees get acquired and that may impact the royalty rates it receives, and I am not aware of any claims by Arm that negotiating a royalty rate for a particular segment with a licensee would necessarily grant Arm royalties in that market.

193. For example, Arm representatives [REDACTED]

[REDACTED] Mr. Haas testified that [REDACTED] when he testified that [REDACTED]

[REDACTED]³⁹⁰ Similarly, when asked why he believed an acquisition of Nuvia was inevitable, Simon Segars, former CEO of Arm,³⁹¹ testified that [REDACTED]

[REDACTED]³⁹²

Further, when asked if he ever expected Nuvia to succeed on its own, Mr. Segars testified that he "[REDACTED] When discussing [REDACTED]

[REDACTED] as of summer 2019, Mr. Williamson testified that he thinks the team [REDACTED]

³⁸⁸ Schoettelkotte Report, p. 56.

³⁸⁹ Schoettelkotte Report, p. 56.

³⁹⁰ Deposition of Rene Haas, December 12, 2023, p. 96.

³⁹¹ Deposition of Simon Segars, November 16, 2023, p. 10.

³⁹² Deposition of Simon Segars, November 16, 2023, p. 78.

³⁹³ Deposition of Simon Segars, November 16, 2023, p. 78.

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██████████ Richard Grisenthwaite, EVP Chief Architect and Fellow at Arm Limited,³⁹⁵ also testified that in regards to when Arm was in discussions with Nuvia about an ALA, he “was worried that [Nuvia] might be commercially unsuccessful, having seen many companies try to get into the same space and be unsuccessful.”³⁹⁶ Further, Arm prepared a royalty model around the time of the Arm / Nuvia ALA and expected Nuvia to enter the server market in 2024 with a 3% market share.³⁹⁷ In total, Arm expected Nuvia to generate \$44.6 million in royalties between 2024 and 2026.³⁹⁸ Consistent with Arm’s testimony, ██████████

██████████ This evidence is inconsistent with Mr. Schoettelkotte’s assumption that Nuvia would have been a successful standalone entity in his but-for world.

194. Mr. Schoettelkotte opines that “[w]ith the loss of Nuvia’s focus on developing a data center CPU, Arm experienced a significant setback in its attempt to develop this particular market segment.”³⁹⁹ Mr. Schoettelkotte identifies market information showing the dominance of Intel’s x86 CPU in the server market and how market participants are looking to shift to alternatives (i.e., non-x86 CPUs).⁴⁰⁰ However, Mr. Schoettelkotte does not account for Arm’s growing presence in this segment with other ALA licensees, including NVIDIA.

195. Specifically, Mr. Haas expressed optimism about Arm’s potential for the server market in Arm’s Q2 FY 2024 Earnings Call Transcript.⁴⁰¹ When asked about the positive catalysts for server, data center, and generative AI computing, Mr. Haas responded that he thinks the market is “broadly a positive” as “there’s a lot of work going on inside the community today

³⁹⁴ Deposition of Paul Williamson, November 9, 2023, p. 199.

³⁹⁵ Deposition of Richard Grisenthwaite, November 15, 2023, p. 8.

³⁹⁶ Deposition of Richard Grisenthwaite, November 15, 2023, p. 42.

³⁹⁷ ARM_00083356, tab “Financial Scenario.”

³⁹⁸ ARM_00083356, tab “Financial Scenario.”

³⁹⁹ Schoettelkotte Report, p. 52.

⁴⁰⁰ Schoettelkotte Report, pp. 52-53.

⁴⁰¹ Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023, p. 17.

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developing custom [chips] that are Arm-based.”⁴⁰² Mr. Haas further stated that “the leading player leading actor in that field...is obviously Nvidia” and that the “AI workloads being pushed onto AI clouds is a tailwind for Arm” and that Arm is “pretty excited by it.”⁴⁰³ In Arm’s Q3 FY 2024 Earnings Call Transcript, Mr. Haas reiterated his optimistic view, stating that Arm is “seeing strong momentum and tailwinds from all things AI” and that Arm is “seeing increased market share gains for [its] products across the board, particularly around automotive and infrastructure/data center.”⁴⁰⁴

196. Also, while Mr. Schoettelkotte contends there is a “significant setback,” he fails to consider other gains that Arm’s architecture will receive if Qualcomm’s decision to introduce ██████████ in the PC market provides market share gains for Arm in that segment. Arm’s documents indicate that there was room for gains in that market, and that datacenter servers and PC markets “are far more difficult to crack. [T]he x86 incumbents in datacenter and PC (Intel and AMD) benefit from an established ecosystem of developers, software, systems, and peripherals.”⁴⁰⁵ Further, Qualcomm’s introduction of ██████████ into other markets, outside of Mr. Schoettelkotte’s narrow focus on the server market, could be beneficial to Arm.

197. Arm, as an intellectual property licensing entity, depends upon the investments and success of its licensees, particularly with respect to ALA licensees. As noted in Mr. Schoettelkotte’s report, Arm’s licensees “were neither able to direct Arm to make the necessary investment in datacenter and PC CPU, nor able to infuse Arm with ecosystem-building expertise it needs.”⁴⁰⁶ Arm’s ALA licensees pay lower royalty rates than TLA royalty rates, but those ALA licensees make substantial independent development efforts to develop products. If those

⁴⁰² Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023, pp. 17-18.

⁴⁰³ Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023, p. 18.

⁴⁰⁴ Arm Holdings plc FQ3 2024 Earnings Call Transcripts, February 7, 2024, pp. 3, 5-6.

⁴⁰⁵ ARM_00088656-684 at ‘658.

⁴⁰⁶ Schoettelkotte Report, p. 55.

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products, such as Qualcomm's [REDACTED], are successful, then Arm, in turn, benefits. However, I see no support for Mr. Schoettelkotte's assumptions in the but-for world that Arm can somehow dictate in which market segment an ALA licensee should invest, that Arm negotiating royalty rates for a particular market segment somehow ensures that successful development will occur, or that Arm can prevent acquisition of one licensee by another. Mr. Schoettelkotte's opinions are therefore unsupported and, from a damages perspective, disconnected from the claims made by Arm in this litigation and fail to incorporate events that are unrelated to the claims made against Defendants in this matter.

iv. There is no analytical or quantitative support for Mr. Schoettelkotte's opinion that Arm will suffer "significant decrease in licensing revenues and Arm's investment in research and development"

198. Mr. Schoettelkotte claims that "the significant decrease in Arm's revenue and investment in research and development ('R&D') and innovation resulting in the loss of control of Arm's intellectual property stemming from Defendants' breach of the Nuvia ALA cannot be readily quantified."⁴⁰⁷ As a threshold matter, Mr. Schoettelkotte claims that Arm will suffer a "significant" decrease in licensing revenues, but he claims that the decline in revenues is not quantifiable. A "significant" decrease is a statement regarding the magnitude of the decrease in revenues. Without actually performing a quantitative analysis, such a quantitative statement has no basis. Further, Mr. Schoettelkotte states that he describes how lower revenues and R&D would "result[] in the loss of control of Arm's intellectual property."⁴⁰⁸ However, as described above, his report does not provide any analysis supporting this claim or the link between Arm's purported decrease in revenues and R&D investments and the control of its intellectual property.

⁴⁰⁷ Schoettelkotte Report, p. 57.

⁴⁰⁸ Schoettelkotte Report, p. 57.

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a. Mr. Schoettelkotte has not demonstrated that Arm's R&D investments are tied to revenue

199. Mr. Schoettelkotte opines that lower revenues would result in lower R&D investment, "which will harm Arm's ability to improve its technology going forward in detrimental ways that cannot be readily quantified with reasonable certainty."⁴⁰⁹ Mr. Schoettelkotte describes the importance of R&D to Arm's business, how R&D drives innovation, and compares R&D expenses to total revenue.⁴¹⁰ By tying R&D to revenue, in order to quantify the impact of a change in revenue on R&D, Mr. Schoettelkotte would have to know the extent to which revenue is changing. Mr. Schoettelkotte performs no such calculation of the change in Arm's revenue. Without that calculation, his claims of an impact to R&D lack an analytical foundation.

200. Further, Mr. Schoettelkotte does not perform any quantitative analysis of the relationship between revenue and R&D expenditure at Arm. Presumably, if Arm's R&D expenses are tied to Arm's revenue, then when revenue grows, R&D expenses grow, and vice versa. However, in Mr. Schoettelkotte's Figure 10, Arm's revenues increased between 2019 and 2020, but its R&D expenses decreased.⁴¹¹ Although not shown on his Figure 10, Arm's revenues slightly decreased in fiscal year 2023, but its R&D increased by 14%.⁴¹² Also, his Figure 10 calculates R&D expenses as a percentage of revenue and the percentage ranges from 33.9% to 47.2% between 2019 and 2022.⁴¹³ This comparison of Arm revenues to its R&D expenses indicates that Arm's R&D expenses are not as directly tied to revenues as Mr. Schoettelkotte claims them to be.⁴¹⁴

⁴⁰⁹ Schoettelkotte Report, p. 57.

⁴¹⁰ Schoettelkotte Report, pp. 57-58.

⁴¹¹ Schoettelkotte Report, p. 58.

⁴¹² Arm Holdings plc Q2 FY 2024 Key Financial Data, tab "IS."

⁴¹³ Schoettelkotte Report, p. 58.

⁴¹⁴ I also disagree with Mr. Schoettelkotte's opinion that "Arm's R&D investments are tied to its revenue stream." See Schoettelkotte Report, p. 59.

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b. ALA licensees are a known pre-existing risk to Arm's revenue stream

201. Mr. Schoettelkotte states that “any significant changes to Arm's expected revenues can impact Arm's future R&D activities, which in turn can lead to a further decline in revenue.”⁴¹⁵ However, Arm's investments are at risk given the presence of an ALA, where ALA licensees can compete directly with Arm. As I described in Section VI.G.i.d, Arm has enabled this competition between an off-the-shelf CPU and a custom CPU, which can impact Arm's business model. Mr. Schoettelkotte references documents that demonstrate how ALA licensees are a risk to Arm's business model. For instance, in its Form F-1 under [REDACTED],” Arm disclosed that [REDACTED]. In the December 2021 initial submission to the CMA, Arm states that [REDACTED]. Thus, the potential impact to Arm's revenues and R&D from a competing custom CPU pre-dates Qualcomm's acquisition of Nuvia and Mr. Schoettelkotte fails to account for the risk Arm faces from ALA agreements in general, unrelated to the claims made against Defendants in this matter.

c. Mr. Schoettelkotte's “knock-on effect” or “downward spiral” opinions are similarly lacking any quantitative analytical foundation

202. Mr. Schoettelkotte opines that there may be a “knock-on effect” or a “downward spiral” from a decline in R&D investments.”⁴¹⁸ Not only does Mr. Schoettelkotte fail to quantify the extent of any claimed decline in Arm revenues, but he also fails to quantify the link between a change in revenue and R&D at Arm. Through his knock-on and spiral opinion, he further extends

⁴¹⁵ Schoettelkotte Report, p. 59.

⁴¹⁶ ARM_01259705-0105 at '9737; Schoettelkotte Report, p. 60.

⁴¹⁷ ARM_00088656-684 at '663; Schoettelkotte Report, p. 60.

⁴¹⁸ Schoettelkotte Report, p. 61.

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his opinions on R&D to another level of unsubstantiated opinions without any analytical quantitative support.

v. Mr. Schoettelkotte ignores that harm to Arm's reputation and goodwill is generally quantifiable

203. Mr. Schoettelkotte opines that there is harm to Arm's reputation and goodwill that cannot be quantified. But from a damages perspective, harm to goodwill is a quantitative conclusion based upon the financial impact that an event has on a business's ability to generate future profits.⁴¹⁹

204. Mr. Schoettelkotte's reputation and goodwill opinion is a recitation of claims of generalized harm to reputation without any independent economic or financial analysis associated with the claimed harm.⁴²⁰ Further, he appears to suggest that Arm has suffered unspecified damage to its brand, but he does not cite any independent support for this claim, such as supporting opinions from marketing or brand experts. Further, he does not perform any economic analysis showing a decrease in the value of Arm's brand due to the vague impacts cited elsewhere in his report.

205. While Mr. Schoettelkotte states in his report and multiple Arm personnel testified to harm incurred by Arm to its goodwill and brand reputation as a result of the Defendants' alleged breach, Arm's public disclosures state that it has identified "no indication of impairment" to its goodwill over its last three fiscal years.⁴²¹ Specifically, Mr. Schoettelkotte opines that Arm's "brand and reputation are critical aspects of its success," and also points to how Arm states in its Form F-1 that "brand and reputation are critical factors in [its] relationships with customers, employees,

⁴¹⁹ Weil, Roman L., et al. *Litigation Services Handbook: The Role of the Financial Expert*, 6th Edition, Wiley, 2017, 4.5, 19.6.

⁴²⁰ See, e.g., The Sedona Conference, *Commentary on Monetary Remedies in Trade Secret Litigation*, 24 SEDONA CONF. J. 349 (2023).

⁴²¹ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 121.

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governments, suppliers, and other stakeholders,” but he does not disclose in his report explicitly how the Defendants’ alleged breach impacts Arm’s reputation and goodwill.⁴²² He simply acknowledges that Arm’s brand and reputation are “critical” to Arm, and then proceeds to point to deposition testimony by Mr. Abbey and Mr. Williamson.⁴²³ Mr. Schoettelkotte presents no analytical or quantitative foundation for the claim that Arm’s brand and reputation has been damaged or will be imminently damaged as a result of the Defendants’ alleged breach, and his claims are contradicted by Arm’s public disclosures in its SEC filings.

vi. Mr. Schoettelkotte’s opinion that the “inadequacy of damages is exacerbated by several additional factors” lacks sufficient support or any independent analysis

206. Mr. Schoettelkotte opines that there are “[s]everal additional factors” that “exacerbate the potential harms to Arm” and the uncertainty of monetary damages adequate to compensate for those harms.⁴²⁴ As described above, to the extent that there is harm suffered by Arm, I have described in the sections above that such harm is quantifiable. Notwithstanding, Mr. Schoettelkotte’s exacerbation and “butterfly effect” opinions lack sufficient support and are part of Arm’s normal course of business, not harm to Arm.

207. Mr. Schoettelkotte states that Qualcomm is a long-term licensee and one of Arm’s largest licensees by revenue, and due to this, Defendants’ alleged actions would have an “outsized impact on Arm.”⁴²⁵ Again, Mr. Schoettelkotte opines on a quantitative issue without any independent quantitative analysis. As described above, the financial impact of Arm’s claims was either already quantified by Arm or could have been quantified by Mr. Schoettelkotte. Correctly

⁴²² Schoettelkotte Report, p. 62; *see also* Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 49.

⁴²³ Schoettelkotte Report, pp. 62-63.

⁴²⁴ Schoettelkotte Report, p. 64.

⁴²⁵ Schoettelkotte Report, pp. 64-65.

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calculated damages do not have an “outsized impact,” but instead quantify the financial impact of the claimed harm related to the specific claims of alleged wrongful conduct made in this case.

208. Mr. Schoettelkotte also identifies the “relative speed with which the CPU industry develops” as “another exacerbating factor” to Arm’s potential harm and that “the total harm to Arm is unpredictable” due to “the rapidly evolving landscape of electronics” which is “amplified by the so-called Butterfly Effect.”⁴²⁶ As an example, Mr. Schoettelkotte states that “an event in the server market that significantly increases demand of server CPUs would have an even larger impact on Arm given Arm’s small market presence in that space and its delayed development of the segment due to Nuvia’s shift away from developing what was a promising alternative to x86-based processors.”⁴²⁷ However, in its Form F-1, Arm acknowledges these “rapid technological changes” as a business risk related to its business and its industry.⁴²⁸ Specifically, Arm states that “[a]s a result of these rapid technological changes and others currently unknown, the future market for [Arm’s] products is difficult to predict.”⁴²⁹ Arm also writes that it “may be unable to predict the timing or development of trends in [its] target markets with any accuracy.”⁴³⁰

209. Mr. Schoettelkotte’s claims regarding Arm’s harms in the server market are also contradicted by Mr. Haas’s public statements, which I discussed above. As noted, Mr. Haas expressed optimism about Arm’s potential for the server market in Arm’s Q2 FY2024 Earnings Call Transcript.⁴³¹ When asked about the positive catalysts for server, data center, and generative AI computing, Mr. Haas responded that he thinks the market is “broadly a positive” as “there’s a lot of work going on inside the community today developing custom [chips] that are Arm-based.”⁴³²

⁴²⁶ Schoettelkotte Report, pp. 65-66.

⁴²⁷ Schoettelkotte Report, p. 66.

⁴²⁸ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 29.

⁴²⁹ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 29.

⁴³⁰ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 29.

⁴³¹ Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023, p. 17.

⁴³² Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023, pp. 17-18.

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Mr. Haas further stated that “the leading player leading actor in that field...is obviously Nvidia” and that the “AI workloads being pushed onto AI clouds is a tailwind for Arm” and that Arm is “pretty excited by it.”⁴³³ In Arm’s Q3 FY2024 Earnings Call Transcript, Mr. Haas reiterated his optimistic view, stating that Arm is “seeing strong momentum and tailwinds from all things AI” and that Arm is “seeing increased market share gains for [its] products across the board, particularly around automotive and infrastructure/data center.”⁴³⁴

210. While Mr. Schoettelkotte attempts to use the server market as an example of specific harm that Arm may incur, his example is no more concrete than the general industry and business risks that Arm presents in its Form F-1. Arm itself clearly presents the business risks related to the industry’s rapid technological advancements and acknowledges that even if it takes steps to develop new products and adapt to its industry, “there can be no assurance” that Arm’s efforts will be fruitful.⁴³⁵

211. In sum, Mr. Schoettelkotte claims that additional factors exacerbate the potential harms to Arm, but Mr. Schoettelkotte provides no evidence or analysis of how these factors do so or that those factors are likely to do so. Rather, as described above, Mr. Schoettelkotte recites factors that Arm acknowledges in its SEC filings as standard business risks for the industry and markets within which it operates. Mr. Schoettelkotte provides no explanation as to how these “additional factors” are caused by Defendants’ alleged wrongful conduct as opposed to other events within Arm’s industry. Further, Mr. Schoettelkotte’s example of an outsized effect on Arm in the server market lacks any reliable foundation and actually fails to accurately characterize Arm’s position in the server market since the Defendants’ alleged breach. Mr. Schoettelkotte’s

⁴³³ Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023, p. 18.

⁴³⁴ Arm Holdings plc FQ3 2024 Earnings Call Transcripts, February 7, 2024, pp. 3, 5-6

⁴³⁵ Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, p. 29.

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claims of additional factors that exacerbate Arm's harms lack foundation, fail to consider the reality of Arm's operating position, and should be disregarded.

VII. REBUTTAL OPINIONS REGARDING CERTAIN OPINIONS CONTAINED IN THE SUBRAMANIAN REPORT

212. Arm's retained contract expert, Guhan Subramanian, issued an expert report on December 20, 2023, which contains his opinions related to issues related to negotiation theory and transactional practice.⁴³⁶ I understand that Defendants have retained John Coates to respond to Mr. Subramanian's report. However, I have been asked by Counsel to respond to certain of Mr. Subramanian's opinions as they relate to the ability to quantify damages.

213. Similar to Mr. Schoettelkotte, Mr. Subramanian claims that Qualcomm's non-compliance or a "renegotiated deal" would cause harm to Arm's reputation and its licensing ecosystem, and that these harms are "impossible to quantify."⁴³⁷

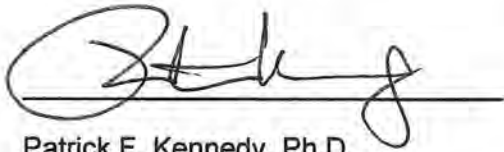
214. For the reasons discussed in detail in the preceding sections of this report, I disagree with Mr. Subramanian's conclusory opinion that Arm's harm in this matter is "virtually impossible to quantify." As discussed above, Arm's damages in this matter can be calculated with reasonable certainty.

⁴³⁶ Subramanian Report, p. 9.

⁴³⁷ Subramanian Report, pp. 60-66.

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I declare under penalty of perjury that the foregoing is true and correct.



Patrick F. Kennedy, Ph.D.

Managing Director

Stout Risius Ross, LLC

2/27/2024

Executed on

EXHIBIT A



Patrick F. Kennedy, PhD

Managing Director

Patrick F. Kennedy is a Managing Director at Stout based in San Diego, CA. Dr. Kennedy provides analysis, consultation, and expert opinions in business and dispute contexts. In his more than 25 years of experience, Dr. Kennedy has testified as an expert in Federal Court, the U.S. Court of Claims, Bankruptcy Court, State Court, and in private arbitrations throughout the country.

Dr. Kennedy has analyzed economic loss and damages in matters with causes of action including, but not limited to, patent, copyright, trademark and trade secret misappropriation, false advertising, breach of contract, product liability, fraud, professional malpractice, negligence, trespass, construction defect, antitrust and unfair competition, insurance bad faith, employment disputes and loss of earnings.

Dr. Kennedy has experience in a wide range of industries involving diverse technology.

PROFESSIONAL EXPERIENCE

2023 to present	Stout	Managing Director
2011 to 2023	Torrey Partners	Managing Director
2006 to 2011	LECG	Managing Director (2008)
1996 to 2006	Mack Barclay, Inc.	Shareholder (1998)
1995 to 1996	International Securities Group, Inc.	Director of Economic Research
1992 to 1995	Board of Governors of the Federal Reserve System, Washington, D.C.	Economist

EDUCATION

Doctorate in Economics, Stanford University, 1992

Awarded Stanford University Fellowship, Bradley Foundation Dissertation Fellowship, and Outstanding Teaching Award

Bachelor of Arts in Economics, University of California, San Diego, 1986

Muir College Valedictorian, Summa Cum Laude and Phi Beta Kappa. Awarded UC Regents Scholarship and the Seymour E. Harris Economics Award

LICENSES AND PROFESSIONAL MEMBERSHIPS

Registered Securities Representative and Registered Principal
(NASD Series 7, 24 and 63 – inactive)

American Economic Association

National Association for Business Economics

National Association for Forensic Economics

Licensing Executive Society

BOARD MEMBERSHIPS

Torrey Pines Bank, Board of Directors

University of California San Diego, Economic Leadership Board Member

SELECTED CASE AND INDUSTRY EXPERIENCE

INTELLECTUAL PROPERTY

- Patent infringement claims including cellular handset technologies, various integrated circuits, medical devices, action cameras, digital image sensors and processing, network and device security, software, social media, unmanned aerial vehicles, advertising, LED backlighting, vehicle equipment and testing, electronic lottery systems, antibacterial products, DNA-based diagnostic testing, radio frequency identification systems, apparel and other products
- Trade secret misappropriation claims including medical devices, responsive website design, drug development, network security, systems integration, merchant services, financial services, fiber-reinforced polymer systems, manufacturing, cellular handsets, Bluetooth devices and other products
- Trademark and copyright infringement claims including cloud storage, luxury watches, musical composition, a nationally branded convention, wireless headsets, food products, fashion accessories, field marketing organizations, ceiling fans, jewelry, toys, apparel, retail and other products

OTHER MATTERS

- Breach of contract, intentional interference with prospective economic advantage, professional malpractice, insurance bad faith and other claims in industries including, but not limited to, oil wells and extraction, pharmaceutical clinical trials, reference microorganisms and cell lines, aircraft rescue and firefighting vehicles, wineries, gaming and casinos, satellite television, water purification filters, defense contracting, aerospace, aircraft charter, medical services, government contracts, veterans counseling services, advertising, national franchises, printing, paper and plastics, multilevel marketing, agriculture, footwear, financial services, insurance brokerage and real estate development
- Qui Tam cases involving overbilling by major systems integrators, faulty illuminating flares used in military aviation, improper testing of semiconductors used in military applications, and faulty design of a spacecraft intended to return solar wind samples to earth
- Foodborne illness and product recall
- Natural disaster business losses, including the Northern and Southern California wildfires
- Eminent domain matters involving real estate development and construction aggregates
- Valuing liabilities associated with future product liability claims for an automobile manufacturer in bankruptcy court
- Valuing technology related to motor vehicle engine diagnostics, drone anti-collision sensor technology and other products and services
- Multidistrict product liability litigation including pharmaceutical products and asbestos
- Consumer and business class actions related to solar panels, a natural gas facility blowout, automotive products, assisted living facilities, mobile home park relocation and cellular services
- Antitrust damages in convention services, telecommunications, and aircraft
- Personal loss including aviation, maritime and under the Vaccine Injury Compensation Program

EXHIBIT B

Patrick F. Kennedy, Ph.D.

Deposition and Trial Testimony

Date	Case Name	Venue	Testimony
02/16/24	Cocke v. United States of America, et al.	GA Southern - Federal Court	Deposition
01/19/24	Saint Paul Commodities, Inc. v. Oleo-X LLC	NY American Arbitration Association	Deposition
12/14/23	Davis v. Secretary of Department of Health and Human Services	Federal Court	Hearing
11/15/23	Eilan v. Secretary of Department of Health and Human Services	Federal Court	Hearing
10/19/23	Stiner, et al. v. Brookdale Senior Living	CA Northern - Federal Court	Declaration
10/16/23	Jones v. Secretary of Department of Health and Human Services	Federal Court	Hearing
09/12/23	Pacific Steel Group v. Commerical Metals Company, et al.	CA Northern - Federal Court	Deposition
09/07/23	Bryan v. Secretary of Department of Health and Human Services	Federal Court	Hearing
09/05/23	Alorica, Inc. v. Fortinet, Inc.	Santa Clara Superior Court	Deposition
08/31/23	Alorica, Inc. v. Fortinet, Inc.	Santa Clara Superior Court	Deposition
08/22/23	Avila v. Joe Avis Farms	SD Superior Court	Trial
06/26/23	Bright v. Brookdale Senior Living Inc.; and Gunza v. Brookdale Senior Living Inc.	TN Middle - Federal Court	Deposition
06/01/23	Bright v. Brookdale Senior Living Inc.; and Gunza v. Brookdale Senior Living Inc.	TN Middle - Federal Court	Declaration
05/17/23	MicroVention, Inc. v. Balt USA, Inc.	CA Central - Federal Court	Deposition
04/26/23	Taction Technology, Inc. v. Apple Inc.	CA Southern - Federal Court	Deposition
04/21/23	Philips North America LLC, et al. v. TEC Holdings, Inc.	NC Western - Federal Court	Trial
04/14/23	Philips North America LLC, et al. v. TEC Holdings, Inc.	NC Western - Federal Court	Trial
04/13/23	PennyMac Loan Services, LLC v. Black Knight Servicing Technologies, LLC	FL Middle - Federal Court	Arbitration
03/09/23	Raymond James Financial, Inc, et al. v. Deutsche Bank AG, et al.	FINRA Dispute Resolution	Arbitration
03/02/23	Wisk Aero LLC v. Archer Aviation, Inc.	CA Northern - Federal Court	Deposition
02/22/23	Raymond James Financial, Inc, et al. v. Deutsche Bank AG, et al.	FINRA Dispute Resolution	Deposition
02/14/23	Crysel v. American Equity	OC Superior Court	Trial
01/19/23	Dexcom v. Abbott	Delaware - Federal Court	Deposition
12/29/22	Crysel v. American Equity	OC Superior Court	Deposition
12/27/22	PennyMac Loan Services, LLC v. Black Knight Servicing Technologies, LLC	FL Middle - Federal Court	Deposition
10/19/22	Avila v. Joe Avis Farms	San Joaquin Superior Court	Deposition
09/22/22	Alcon Vision, LLC v. Lens.com, Inc.	NY Eastern - Federal Court	Deposition
08/17/22	Vitalyte Sports Nutrition, Inc. v. Revitalyte, LLC	TX Western - Federal Court	Deposition
08/11/22	Sunstone Information Defense, Inc. v. International Business Machines Corporation	TX Western - Federal Court	Trial
08/04/22	Rodriguez, et al. v. Sea Breeze Jet Ski, LLC	CA Northern - Federal Court	Deposition
07/28/22	Kurin, Inc. v. Magnolia Medical Technologies, Inc.	Delaware - Federal Court	Trial
05/18/22	Stiner, et al. v. Brookdale Senior Living Inc et al.	CA Northern - Federal Court	Declaration
05/11/22	CRF Frozen Foods v. Pictsweet, et al.	TN Middle - Federal Court	Deposition
05/04/22	Ayers v. The Penta Building Group	Riverside Cty Superior Court	Trial
03/25/22	The Waffle v. Tucker Investments	LA Superior Court	Trial
02/17/22	Sunstone Information Defense, Inc. v. International Business Machines Corporation	TX Western - Federal Court	Deposition
01/27/22	Chan v. Kimball, Tirey & St. John	SD Superior Court	Deposition
01/17/22	MedImpact Healthcare Systems, Inc. v. IQVIA, Inc.	CA Southern - Federal Court	Deposition
01/14/22	Nelson v. United States of America, et al.	OR - Federal Court	Trial
01/05/22	DeLeon-Piedra v. Ocean Angel V	CA Northern - Federal Court	Deposition
12/14/21	Stiner, et al. v. Brookdale Senior Living Inc et al.	CA Northern - Federal Court	Deposition
12/01/21	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Deposition
11/18/21	Bellin Memorial Hospital v. Kinsey & Kinsey, Inc.	WI Federal Court	Trial
11/15/21	The Waffle v. Tucker Investments	LA Superior Court	Deposition
10/21/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	SD Superior Court	Deposition
10/18/21	Philips North America LLC, et al. v. Dorow	NC Federal Court	Deposition
10/18/21	Philips North America LLC, et al. v. Zimmerman, et al.	NC Federal Court	Deposition
10/12/21	MicroVention, Inc. v. Balt USA, Inc.	CA Central - Federal Court	Deposition
10/08/21	In re: PFA Insurance Marketing	CA Northern - Federal Court	Declaration
09/23/21	LISCR, LLC v. Legality Holdings, S.A.	VA Eastern - Federal Court	Deposition
09/17/21	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior Court	Trial
09/08/21	Philips North America LLC, et al. v. TEC Holdings, Inc.	GA Northern - Federal Court	Deposition
09/02/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	SD Superior Court	Deposition
08/26/21	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior Court	Trial
08/18/21	Stiner, et al. v. Brookdale Senior Living, et al.	CA Northern - Federal Court	Declaration
08/06/21	Kiva Health Brands, LLC v. Kiva Brands, Inc. et al.	CA Northern - Federal Court	Deposition
07/22/21	Fifth Avenue Landing v. RGC FAL, LLC	SD Superior Court	Trial
07/16/21	In re: PFA Insurance Marketing	CA Northern - Federal Court	Deposition
07/15/21	Solid 21, Inc. v. Richemont North America, Inc., et al.	NY Southern - Federal Court	Deposition
07/09/21	Fifth Avenue Landing v. RGC FAL, LLC	SD Superior Court	Deposition
06/22/21	Gillespie v. CalTrans, et al.	Riverside Superior Court	Deposition
06/09/21	Gillespie v. CalTrans, et al.	Riverside Superior Court	Deposition

Patrick F. Kennedy, Ph.D.
Deposition and Trial Testimony

Date	Case Name	Venue	Testimony
06/08/21	The Chicago Trust Company v. Lakeshore Recycling Systems, LLC	IL Federal Court	Deposition
06/03/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	SD Superior Court	Deposition
05/06/21	Micheli, et al. v. The City of Fresno	Fresno Superior Court	Declaration
04/23/21	Kurin Inc. v. Magnolia Medical Technologies	Delaware - Federal Court	Deposition
04/22/21	Perdue v. American Marine Corporation	LA Superior Court	Deposition
04/13/21	Newirth, et al. v. Aegis Senior Communities, LLC	CA Northern - Federal Court	Declaration
04/02/21	Philips North America LLC, et al. v. Summit Imaging Inc, et al.	WA Western - Federal Court	Deposition
03/25/21	Solid 21, Inc. v. Breitling USA Inc.	CT Federal Court	Deposition
03/09/21	Applied Medical Distribution Corporation v. Bruin Biometrics, LLC	OC Superior Court	Trial
01/20/21	Vertellus Holdings LLC, et al. v. W.R. Grace & Co-Conn	MD Federal Court	Deposition
01/15/21	Bellin Memorial Hospital v. Kinsey & Kinsey, Inc.	WI Federal Court	Deposition
11/04/20	Applied Medical Distribution Corporation v. Bruin Biometrics, LLC	OC Superior Court	Deposition
10/30/20	Underwater Kinetics v. Hanover Insurance	SD Superior Court	Deposition
10/29/20	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Deposition
07/14/20	Heredia, et al. v. Sunrise Senior Living, LLC	CA Central - Federal Court	Deposition
06/30/20	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Deposition
06/23/20	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior Court	Deposition
05/18/20	Heredia, et al. v. Sunrise Senior Living, LLC	CA Central - Federal Court	Declaration
05/15/20	Shaw v. United States of America, et al.	CA Northern - Federal Court	Deposition
01/13/20	Vogel, et al. v. FCA US, LLC, et al.	SD Superior	Deposition
01/10/20	Bell Northern Research, LLC v. Coolpad Technologies, Inc.	CA Southern - Federal Court	Deposition

EXHIBIT C

**Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.
Documents Considered List****Exhibit C**

Date	Description
<i>*In addition to the materials listed below, the materials I considered also include all cited sources in my expert report, as well as all of the materials cited and/or referenced in Mr. Schoettelkotte's expert report.</i>	
Legal	
08/31/22	Complaint and Exhibits, Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and Nuvia, Inc., Civil Action No. 1:22-cv-01146-MN
09/30/22	Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Counterclaim
10/26/22	Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Amended Counterclaim
11/15/22	Plaintiff Arm Ltd.'s Answer and Affirmative Defenses to Defendants Qualcomm Inc., Qualcomm Technologies, Inc., and Nuvia, Inc.'s Amended Counterclaim
12/19/22	Scheduling Order
02/27/23	Arm Ltd.'s Objections and Responses to Qualcomm's First Set of Interrogatories (Nos. 1–11)
02/27/23	Arm Ltd.'s Objections and Responses to Qualcomm's First Set of Requests for Production (Nos. 1–36)
02/27/23	Defendants' Responses and Objections to Plaintiff's First Set of Interrogatories (Nos. 1–13)
02/27/23	Defendants' Responses and Objections to Plaintiff's First Set of Requests for Production (Nos. 1–51)
04/04/23	Arm Ltd.'s First Amended Objections and Responses to Qualcomm's First Set of Requests for Production (Nos. 1–36)
05/04/23	Defendants' Responses and Objections to Plaintiff's Second Set of Requests for Production (Nos. 52–58)
05/05/23	Arm Ltd.'s First Objections and Responses to Qualcomm's Second Set of Requests for Production (Nos. 37–50)
06/23/23	Defendants' First Supplemental Responses and Objections to Plaintiff's First Set of Interrogatories (Nos. 1–4 and 6)
07/14/23	Arm Ltd.'s First Objections and Responses to Qualcomm's Third Set of Requests for Production (Nos. 51–54)
08/18/23	Defendants' Responses and Objections to Plaintiff's Third Set of Requests for Production (Nos. 59–122)
09/21/23	Stipulation and Order to Amend Case Scheduling Order
10/02/23	Arm Ltd.'s Objections and Responses to Qualcomm's Second Set of Interrogatories (Nos. 12–19)
10/02/23	Plaintiff Arm Ltd.'s Objections and Responses to Defendant Qualcomm's Fourth Set of Requests for Production (Nos. 55–70)
10/18/23	Qualcomm's First Requests for Admissions to Plaintiff (Nos. 1-30)
10/20/23	Defendants' Responses and Objections to Plaintiff's First Set of Requests for Admission (Nos. 1-30)
10/26/23	Defendants' Supplemental and Amended Response and Objections to Plaintiff's First Set of Interrogatories (No. 5)
10/27/23	Defendants' Responses and Objections to Plaintiff's Second Set of Interrogatories
11/09/23	Arm Ltd.'s Objections and Responses to Qualcomm's Third Set of Interrogatories (No. 20)
11/17/23	Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Second Set of Interrogatories (Nos. 12–19)
11/17/23	Arm Ltd.'s Objections and Responses to Qualcomm's Fourth Set of Interrogatories (Nos. 21–25)
11/17/23	Arm Ltd.'s Second Supplemental Objections and Responses to Qualcomm's First Set of Interrogatories (Nos. 1–11)
11/17/23	Arm Ltd.'s Supplemental Objections and Responses to Qualcomm's Third Set of Interrogatories (No. 20)
11/17/23	Defendants' First Supplemental Responses and Objections to Plaintiff's Second Set of Interrogatories (Nos. 15-16)
11/17/23	Defendants' Responses and Objections to Plaintiff's Fourth Set of Requests for Production (No. 123)
11/17/23	Defendants' Supplemental Responses and Objections to Plaintiff's First Set of Interrogatories (Nos. 7–12)
11/17/23	Plaintiff Arm Ltd.'s Objections and Responses to Defendant Qualcomm's Fifth Set of Requests for Production (Nos. 71–124)
11/17/23	Plaintiff Arm Ltd.'s Responses and Objections to Qualcomm's First Requests for Admissions to Plaintiff (Nos. 1–30)
Depositions	
09/22/23	Deposition of Rohit Singh and Exhibits Director of Program Management at Qualcomm, Inc.
10/12/23	Deposition of Manu Gulati and Exhibits VP of Engineering at Qualcomm, Inc.
10/20/23	Deposition of Ramakrishna "RK" Chunduru and Exhibits Former Chief Procurement Officer at Qualcomm, Inc.
10/25/23	Deposition of Tim Herbert and Exhibits Former Vice President of North American Sales at Arm Ltd.
10/25/23	Deposition of Jignesh Trivedi and Exhibits Director and CPU DV Lead at Qualcomm, Inc.
10/27/23	Deposition of Will Abbey and Exhibits Executive Vice President and Chief Commercial Officer of Arm Ltd.
11/02/23	Deposition of Lynn Couillard and Exhibits Vice President of Sales at Arm Ltd.
11/03/23	Deposition of Gerard Williams III and Exhibits Senior Vice President of Engineering at Qualcomm, Inc.
11/08/23	Deposition of Ziad Asghar and Exhibits Senior Vice President of Product Management at Qualcomm, Inc.
11/09/23	Deposition of Paul Williamson and Exhibits Senior Vice President and General Manager of IOT at Arm Ltd.
11/15/23	Deposition of Cristiano Amon and Exhibits CEO of Qualcomm, Inc.
11/15/23	Deposition of Richard Grisenthwaite and Exhibits EVP Chief Architect and Fellow at Arm Ltd.
11/16/23	Deposition of Simon Segars and Exhibits Former CEO of Arm Ltd.
11/27/23	Deposition of Nitin Sharma and Exhibits Former Director of Engineering at Qualcomm, Inc.
11/28/23	Deposition of Michael Roberts VP Head of Global Product, Partner and Technology Marketing at Qualcomm, Inc.
11/28/23	Deposition of James H. Thompson and Exhibits CTO of Qualcomm, Inc.
11/29/23	Deposition of Lynn Bos and Exhibits Director of Program Management at Qualcomm, Inc.
11/30/23	Deposition of Karthik Shivashankar and Exhibits Senior Director of Wearables and Commercial Licensing at Arm Ltd.
12/01/23	Deposition of Pradeep Kanapathipillai and Exhibits CPU Architect at Qualcomm, Inc.
12/07/23	Deposition of Mark Werkheiser and Exhibits Distinguished Engineer at Arm Ltd.
12/08/23	Deposition of Jonathan Armstrong and Exhibits Head of Brand and Creative Services at Arm Ltd.
12/08/23	Deposition of Geeta Balakrishnan and Exhibits Engineer at Qualcomm, Inc.
12/12/23	Deposition of Rene Haas and Exhibits CEO of Arm Ltd.
12/14/23	Deposition of Laura Sand and Exhibits Senior Vice President Legal Counsel at Qualcomm, Inc.
12/14/23	Deposition of Vivek Agrawal Senior Principal Engineer at Arm Ltd.
12/19/23	Deposition of Christine Tran and Exhibits Senior Direct of Legal at Arm Ltd.
12/20/23	Deposition of Ian Thornton and Exhibits Investor Relations at Arm Ltd.
Other Expert Reports	
12/20/23	Expert Report of W. Todd Schoettelkotte
12/20/23	Expert Report of Professor Guhan Subramanian
12/20/23	Expert Report of Ravi Dhar Regarding Trademark Infringement
12/20/23	Opening Expert Report of Dr. Robert P. Colwell
12/20/23	Opening Expert Report of Dr. Shuo-Wei (Mike) Chen
12/20/23	Opening Expert Report of Dr. Murali Annavaram

Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.
Documents Considered List

Exhibit C

Date	Description
Produced Documents	
<i>*If the bates number referenced below is the beginning of a document/production, the bates reference is to the entire document.</i>	
<i>*I had access to a document repository containing documents produced by Arm, Qualcomm, and other 3rd parties.</i>	
ARM_00000017	ARM_00086285 ARM_01286878 QCARM_0351402
ARM_00000020	ARM_00086479 ARM_01287108 QCARM_0352878
ARM_00000022	ARM_00086829 ARM_01287295 QCARM_0353333
ARM_00001715	ARM_00087296 ARM_01287296 QCARM_0356834
ARM_00001717	ARM_00087367 ARM_01287307 QCARM_0363038
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ARM_00010559	ARM_00087462 ARM_01289549 QCARM_0569125
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ARM_00036888	ARM_00088656 ARM_01291017 QCARM_2399321
ARM_00037006	ARM_00089826 ARM_01291196 QCARM_2411762
ARM_00037729	ARM_00089848 ARM_01291202 QCARM_2413917
ARM_00045444	ARM_00089894 ARM_01291536 QCARM_2417977
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ARM_00052070	ARM_00090062 ARM_01292866 QCARM_2551531
ARM_00056401	ARM_00093262 ARM_01292867 QCARM_3042071
ARM_00057152	ARM_00094237 ARM_01293311 QCARM_3042076
ARM_00057423	ARM_00095789 ARM_01293312 QCARM_3314298
ARM_00057479	ARM_00095791 ARM_01294035 QCARM_3415301
ARM_00058159	ARM_00095975 ARM_01294037 QCARM_3429791
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ARM_00063694	ARM_00112064 QCARM_0002749 QCARM_3485462
ARM_00063712	ARM_00113276 QCARM_0019931 QCARM_3486238
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ARM_00080051	ARM_01229530 QCARM_0167928 QCARM_3535536
ARM_00080608	ARM_01232495 QCARM_0213947 QCARM_3535752
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ARM_00085628	ARM_01266931 QCARM_0343143 QCARM_7434228
ARM_00085683	ARM_01281879 QCARM_0343533 QCARM_7467440
ARM_00085719	ARM_01282466 QCARM_0343649 QCARM_7467691
ARM_00086043	ARM_01284127 QCARM_0343954 QCARM_7481022
ARM_00086244	ARM_01284304 QCARM_0346226 QCARM_7505464
ARM_00086247	ARM_01284980 QCARM_0346227
ARM_00086275	ARM_01285278 QCARM_0346228
ARM_00086284	ARM_01286135 QCARM_0350826

**Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.
Documents Considered List**

Exhibit C

Date	Description
<i>Research</i>	<p> Ampere's Second Mot. for Protective Order Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023 Arm Holdings plc Form 424(b)(4), September 14, 2023 Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023 Arm Holdings plc FQ3 2024 Earnings Call Transcripts, February 7, 2024 Arm Holdings plc FQ3 2024 Results Presentation, February 7, 2024 Arm Holdings plc Q2 FY 2024 Key Financial Data Arm Holdings plc Q2 FY 2024 Shareholder Letter Arm Holdings plc Q3 FY 2024 Key Financial Data Arm Holdings plc Q3 FY 2024 Shareholder Letter Hearing Transcript, September 29, 2023 Nvidia-Arm, A report to the Secretary of State for Digital, Culture, Media & Sport on the anticipated acquisition by NVIDIA Corporation of Arm Limited, July 20, 2021 Qualcomm Incorporated FQ1 2024 Earnings Call Transcripts, January 31, 2024 Qualcomm Incorporated, Form 10-K for fiscal year ended September 24, 2023 Reference Manual on Scientific Evidence, Federal Judicial Center and National Research Council of the National Academies S&P Capital IQ, Infineon Technologies AG Transaction Details, Merger/Acquisition: Cypress Semiconductor Corporation S&P Capital IQ, Nuvia, Inc. Transaction Details, Merger/Acquisition: Qualcomm Technologies, Inc. S&P Capital IQ, Nuvia, Inc. Transaction Details, Private Placement: Mayfield Fund, LLC The Sedona Conference, Commentary on Monetary Remedies in Trade Secret Litigation, 24 SEDONA CONF. J. 349 (2023) Weil, Roman L., et al. Litigation Services Handbook: The Role of the Financial Expert, 6th Edition, Wiley, 2017 </p> <p> https://9to5mac.com/2019/11/15/three-former-apple-execs-create-new-chip-company-will-compete-with-intel-and-amd/ https://aws.amazon.com/what-is/cpu/ https://download.intel.com/newsroom/kits/40thanniversary/pdfs/What_is_a_Microprocessor.pdf https://futurumgroup.com/about-us/who-we-are/ https://futurumgroup.com/insights/qualcomm-snapdragon-x-elite-and-aim-to-disrupt-the-pc-market/ https://investors.arm.com/static-files/187d293b-42eb-48b0-b82f-e78bce4da9e4 https://mixed-news.com/en/samsung-xr-devices-will-use-google-and-qualcomm-tech/ https://newsroom.arm.com/news/arm-announces-closing-of-initial-public-offering https://nvidianews.nvidia.com/news/nvidia-introduces-grace-cpu-superchip https://pc-tablet.com/qualcomm-throws-down-the-gauntlet-snapdragon-xr2-gen-2-challenges-apples-vision-pro-in-mixed-reality-race/ https://support.microsoft.com/en-us/windows/common-pc-and-device-terms-4542f069-4cf7-431a-bb6b-c6cbdbe3e6e9 https://techcrunch.com/2020/09/24/nuvia-series-b https://viewpoint.pwc.com/dt/us/en/pwc/pwc_sec_volume/pwc_sec_volume_US/8000_registration_an_US/sec_8110_form_f1_US.html#pwc-topic.dita_fb3ce65d-0b9d-4db7-92ff-4e1fd99ba885 https://www.americanbar.org/groups/tort_trial_insurance_practice/committees/automobile-litigation/safety_regulatory_considerations/ https://www.androidauthority.com/mobile-processors-2022-2741344/ https://www.arm.com/glossary/adas https://www.arm.com/glossary/connected-devices https://www.arm.com/glossary/cpu https://www.arm.com/glossary/iot-devices https://www.arm.com/glossary/smart-devices https://www.arm.com/glossary/soc-development https://www.cnbc.com/2023/11/09/how-arm-gained-chip-dominance-with-apple-nvidia-amazon-and-qualcomm.html https://www.cnet.com/tech/computing/qualcomms-pc-chip-could-mean-windows-pcs-as-good-as-apple-macbooks/ https://www.eweek.com/servers/cavium-introduces-thunderx2-arm-server-chip-for-data-center-systems/ https://www.globenewswire.com/news-release/2019/11/15/1948072/0/en/NUVIA-Raises-53-Million-to-Reimagine-Silicon-Design-for-the-Data-Center.html https://www.intel.com/content/www/us/en/products/docs/processors/xeon/server-processor-overview.html https://www.intel.com/content/www/us/en/support/articles/000056236/intel-nuc.html https://www.lenovo.com/us/en/glossary/cpu-core/ https://www.lenovo.com/us/en/glossary/instruction-set-architecture/ https://www.lenovo.com/us/en/glossary/x86/ https://www.linkedin.com/in/ivan-knez/ https://www.linkedin.com/in/peter-greenhalgh-8900789b/ https://www.linkedin.com/in/shultzwang/ https://www.linkedin.com/in/todd-lepinski-ababaa9/ https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-the-internet-of-things https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/M29QualcommPDFa.pdf https://www.qualcomm.com/news/onq/2013/06/mobile-processors-101-why-smartphones-are-smarter-all-one-processor https://www.qualcomm.com/news/onq/2022/11/qualcomm-m-cpu-at-center-of-next-gen-premium-experiences-on-snapdragon-platforms https://www.qualcomm.com/news/releases/2005/11/qualcomm-introduces-worlds-most-advanced-mobile-microprocessor https://www.qualcomm.com/news/releases/2021/01/qualcomm-acquire-nuvia https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia https://www.qualcomm.com/news/releases/2023/10/qualcomm-unleashes-snapdragon-x-elite--the-ai-super-charged-plat https://www.qualcomm.com/products/technology/processors https://www.qualcomm.com/research/extended-reality https://www.sec.gov/files/reada10k.pdf https://www.telink-semi.com/system-on-chip/ https://www.tomshardware.com/news/arm-based-cpus-set-to-double-notebook-pc-market-share-by-2027 https://www.tomshardware.com/pc-components/cpus/arm-pc-market-share-shrinks-mercury-research https://www.tomshardware.com/reviews/glossary-soc-system-on-chip-definition,5890.html https://www.wired.com/story/apples-new-macbook-pro-chips-flex-power-custom-silicon/ </p>

Exhibit 9

JOHN C. COATES Highly Confidential - AEO
ARM LTD. vs QUALCOMM, INC.

April 19, 2024

1

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

-----x
ARM LTD., a U.K. Corporation,
Plaintiff, C.A. No.
v. 22-1146-MN
QUALCOMM, INC., A Delaware
corporation, QUALCOMM TECHNOLOGIES,
INC., a Delaware corporation, and
NUVIA, INC., a Delaware corporation,
Defendants.

-----x
HIGHLY CONFIDENTIAL
ATTORNEYS' EYES ONLY

VIDEOTAPED DEPOSITION OF JOHN C. COATES
Friday, April 19, 2024
Boston, Massachusetts

Reporter: Michael D. O'Connor, RMR, CRC, CRR
Job No. J11126504

JOHN C. COATES Highly Confidential - AEO
ARM LTD. vs QUALCOMM, INC.

April 19, 2024

3

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2
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10 - and -

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JOHN C. COATES Highly Confidential - AEO
ARM LTD. vs QUALCOMM, INC.

April 19, 2024

4

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2
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11 MADALYN VAUGHN, ESQ.

12 mvaughn@paulweiss.com

13
14 Also Present:

15 David Woodford, Videographer
16
17
18
19
20
21
22
23
24
25

JOHN C. COATES Highly Confidential - AEO
ARM LTD. vs QUALCOMM, INC.

April 19, 2024

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I N D E X

Deposition of:	Page
JOHN C. COATES	
By Mr. Olson	7

E X H I B I T S

No.		Page
Exhibit 1	Expert Rebuttal Report of Professor John Coates, 2/27/24	7
Exhibit 2	Expert Report of Professor Guhan Subramanian, 12/20/23	7
Exhibit 3	Expert Reply Report of Professor Guhan Subramanian, 3/25/24	9

JOHN C. COATES Highly Confidential - AEO
ARM LTD. vs QUALCOMM, INC.

April 19, 2024

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1	sworn.	08:57:07
2	MR. OLSON: Erik Olson of Morrison	08:57:09
3	& Foerster for ARM.	08:57:13
4	MS. TAVERNIER: Nishi Tavernier,	08:57:13
5	Morrison & Foerster for ARM.	08:57:15
6	MR. OLSON: Madalyn Vaughn of Paul	08:57:18
7	Weiss on behalf of Defendants.	08:57:20
8	MS. NYARADY: Catherine Nyarady	08:57:23
9	also from Paul Weiss.	08:57:25
10		
11	JOHN C. COATES	
12		
13	having been satisfactorily identified by the	
14	production of his driver's license, and duly	
15	sworn by the Notary Public, was examined and	
16	testified as follows:	
17		
18	(Document marked as Exhibit 1	
19	for identification)	
20	(Document marked as Exhibit 2	
21	For identification)	
22	EXAMINATION	
23	BY MR. OLSON:	08:57:34
24	Q. Mr. Coates, let's start with a	08:57:34
25	kind of an administrative matter. I have	08:57:43

JOHN C. COATES Highly Confidential - AEO
ARM LTD. vs QUALCOMM, INC.

April 19, 2024

14

1 Q. Are you giving any opinions about
2 the law as it applies to this case?

09:05:12

09:05:15

3 A. You know, I don't think so.

09:05:17

4 Although, as you know from my report, there

09:05:23

5 were times in Professor Subramanian's initial

09:05:25

6 report, and actually even more in his reply,

09:05:29

7 where he does speak to his take on what a

09:05:32

8 contract in this matter says, which seemed to

09:05:39

9 me to be about legal interpretation. And so, I

09:05:41

10 have views relative to that.

09:05:47

11 I don't think -- I have not done

09:05:49

12 contract law analysis for purposes of the case

09:05:53

13 myself. I don't agree with his opinions, as of

09:05:54

14 course you know. To the extent that somebody

09:05:59

15 can view that as legal opinion, I suppose I'm

09:06:03

16 responding to his legal opinion. But beyond

09:06:06

17 that, no.

09:06:08

18 Q. All right. Let me explore some of

09:06:09

19 the things you said in that in a little bit,

09:06:10

20 but let me work through some other pieces

09:06:13

21 first.

09:06:16

22 You are a professor at Harvard Law

09:06:16

23 School, correct?

09:06:18

24 A. Yes.

09:06:19

25 Q. Are you a professor at the

09:06:19

JOHN C. COATES Highly Confidential - AEO
ARM LTD. vs QUALCOMM, INC.

April 19, 2024

17

1 for or negotiating for if they join a board
2 line D&O insurance, indemnity contracts, and
3 the like.

4 I don't do any exercises and I
5 don't engage in any elaborate application of
6 negotiation theory, but we do kind of do some
7 role-play of how one would go about asking for
8 those sorts of things.

9 Q. When, if at all, was the last time
10 that you taught a course on negotiation and
11 negotiation theory?

12 A. I don't believe I've ever taught a
13 course that in its entirety was negotiations or
14 negotiation theory. I taught it as a component
15 of courses, but not as a separate, stand-alone
16 topic.

17 Q. When was the last time you
18 submitted a paper for publication that was on
19 the topic of negotiation or negotiation theory
20 as its central matter?

21 A. I don't, again, think I've written
22 squarely on the topic of negotiation theory at
23 a high level as a stand-alone matter. Again,
24 negotiations, because it interacts with every
25 major significant business relationship, much

1 less contracts and the like, and I've written 09:10:06
2 about M&A contracts many, many times, and so 09:10:09
3 part of the publications would include elements 09:10:11
4 of negotiation. But I have not written about 09:10:13
5 it as a stand-alone topic. 09:10:18

6 Q. Have you ever served as an 09:10:21
7 employee of a company as opposed to a school? 09:10:24

8 A. Do you mean like a for-profit 09:10:27
9 business? 09:10:35

10 Q. Correct. 09:10:36

11 A. A long time ago. I worked for 09:10:36
12 banks and McDonald's when I was in high school. 09:10:40
13 You know, I have been an employee, but not 09:10:43
14 since I have been at Harvard. 09:10:48

15 Since I came to Harvard, I've 09:10:49
16 worked for Harvard. I've worked as a 09:10:52
17 consultant, but that's not as an employee, and 09:10:53
18 I've worked for the SEC, but that's not a for 09:10:56
19 profit. 09:10:59

20 Q. And do you serve as a board member 09:11:00
21 on any for-profit companies? 09:11:06

22 A. No. 09:11:08

23 Q. Have you ever done so? 09:11:08

24 A. No. 09:11:10

25 Q. There's another exhibit, Exhibit 09:11:10

1 Q. Okay. Let me go back to my 10:18:35
2 questions. So you're not an expert on 10:18:37
3 technology, correct? 10:18:40

4 A. I don't believe so, no. 10:18:41

5 Q. You're not an expert on 10:18:43
6 semiconductors, correct? 10:18:44

7 A. No. 10:18:46

8 Q. Are you an expert on intellectual 10:18:46
9 property? 10:18:49

10 A. I've had to learn and have in my 10:18:49
11 head knowledge about intellectual property that 10:18:55
12 is probably not typical of people. I don't 10:18:59
13 teach the topic and I don't write on the topic. 10:19:02

14 I've had to learn about it in the 10:19:04
15 context of my practice and in some litigations, 10:19:07
16 like this one. So, you know, I would not 10:19:10
17 ordinarily tell someone they should hire me as 10:19:18
18 an expert in intellectual property. 10:19:24

19 Q. The same would be true for 10:19:26
20 patents, correct? 10:19:28

21 A. Yes. 10:19:28

22 Q. And the same would be true for 10:19:29
23 trademarks, correct? 10:19:31

24 A. Yes. 10:19:31

25 Q. And the same would be true for 10:19:32

1 Again, I don't think I'm going to 10:20:55
2 stand up and say, here's what I think trade 10:20:57
3 secret law is. That wouldn't -- that's not 10:21:01
4 something I've included in the report. So, no, 10:21:04
5 as to that. 10:21:07

6 Q. Mr. Coates, have you ever 10:21:08
7 negotiated an IP licensing agreement, that is 10:21:12
8 the initial agreement? 10:21:19

9 MS. VAUGHN: Objection to form. 10:21:19

10 A. I don't believe I have as a 10:21:20
11 stand-alone matter, except possibly as part of 10:21:21
12 my work as an academic, but I mean, to the 10:21:23
13 extent, you know, I don't know how encompassing 10:21:26
14 you're being in that question, but not 10:21:29
15 uncommonly in the course of publishing 10:21:34
16 something I'm given something that either is or 10:21:35
17 isn't a license back and forth about the right 10:21:38
18 to use the material in various ways. 10:21:40

19 Putting aside that very limited 10:21:43
20 exception where it's really not relevant to 10:21:46
21 this case, no, I don't believe I've negotiated 10:21:48
22 directly on behalf of a company for the first 10:21:52
23 time entering into a license agreement. 10:21:55

24 Q. So that I have and can understand 10:21:57
25 it clearly, you have not ever negotiated on 10:22:05

1 when was the last time, if ever, that you
2 consulted on a stand-alone IP license
3 agreement?

4 A. My work largely consists of
5 consulting on M&A transactions or things
6 generically in the overall category of business
7 combinations, and I don't think I have
8 consulted specifically about licenses in the
9 abstract.

10 Q. Do you consider yourself to be an
11 expert regarding different IP licensing models?

12 MS. VAUGHN: Objection to form.

13 A. Again, I have come to know more
14 than I suspect the average citizen knows about
15 different ways of thinking about licensing, but
16 I would not normally be expecting clients to
17 come to me for advice about licensing models.

18 Q. That is, you would not hold
19 yourself out to clients as being an expert on
20 IP licensing models?

21 MS. VAUGHN: Objection to form.

22 A. Again, as a freestanding matter,
23 no. Again, I'm not an IP person in that way,
24 no. I know what I know, because it relates to
25 M&A transactions, and in that context, I might,

1 but not -- not as a general licensing matter. 10:27:12

2 Q. Do you hold yourself out to 10:27:16
3 clients as an expert on IP licensing? 10:27:17

4 MS. VAUGHN: Objection to form. 10:27:21

5 A. Again, in the context of an M&A 10:27:22
6 deal, I do need to know a lot more than most 10:27:27
7 people, either as a lawyer when I was a lawyer 10:27:29
8 or as a consultant now, to be able to advise in 10:27:32
9 consulting or teach in a classroom about M&A. 10:27:36

10 So I do think I have greater 10:27:39
11 knowledge about licensing practices and terms 10:27:45
12 than most people. Again, it's not something 10:27:49
13 that I would -- I have not ever taught a 10:27:51
14 freestanding IP licensing course, for example. 10:27:54

15 Q. Have you ever taught a course 10:27:57
16 dedicated solely to intellectual property? 10:28:01

17 A. No. 10:28:03

18 Q. You do consider yourself to be an 10:28:03
19 expert about mergers and acquisitions, correct? 10:28:14

20 A. Yes. I know a lot more about that 10:28:17
21 than most people, yes. 10:28:19

22 Q. So I want to go back and 10:28:20
23 understand. Outside of your expertise on 10:28:22
24 mergers and acquisitions, I want to use the 10:28:25
25 word that you used earlier, do you hold 10:28:28

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1 disagree with, as you know. 10:39:53

2 Q. I'm going to try to make good on 10:39:54
3 my promise with you and stopping there for the 10:39:56
4 moment. 10:39:59

5 THE VIDEOGRAPHER: This is the end 10:39:59
6 of media unit number one. Off the 10:40:00
7 record, 10:40 a.m. 10:40:03

8 (Recess taken at 10:40 a.m. and 10:40:04
9 reconvening at 10:52 a.m.) 10:40:08

10 THE VIDEOGRAPHER: This is the 10:51:56
11 beginning of media unit two on the 10:52:04
12 record at 10:52 a.m. 10:52:06

13 BY MR. OLSON: 10:52:08

14 Q. Mr. Coates, did you during the 10:52:08
15 break discuss any part of the substance of your 10:52:11
16 testimony? 10:52:14

17 A. No. 10:52:15

18 Q. Anything about what we discussed 10:52:15
19 during the first hour and 45 minutes or so? 10:52:17

20 A. No. 10:52:22

21 Q. Can you explain to me what an ISA 10:52:22
22 is? 10:52:31

23 A. No. 10:52:31

24 Q. Can you explain to me what a 10:52:32
25 microarchitecture is? 10:52:35

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1	A.	Sounds like a small architecture.	10:52:36
2		That's the best I can do.	10:52:39
3	Q.	Can you explain what a CPU is?	10:52:41
4	A.	That one I've heard more routinely	10:52:43
5		in my life. Central processing unit of a	10:52:45
6		computer, but that's again about the depth I'm	10:52:48
7		going to get you to.	10:52:53
8	Q.	Can you explain what an SoC is?	10:52:54
9	A.	No.	10:52:57
10	Q.	Can you explain what RTL is?	10:52:57
11	A.	No.	10:53:00
12	Q.	Can you explain what a cortex core	10:53:00
13		is?	10:53:02
14	A.	No.	10:53:02
15	Q.	Can you explain how cores for	10:53:02
16		servers differ from a core used for large	10:53:04
17		screen computing?	10:53:05
18	A.	No.	10:53:08
19	Q.	Can you explain how a core used	10:53:08
20		for servers differs from a core used for mobile	10:53:08
21		devices?	10:53:13
22	A.	No.	10:53:13
23	Q.	Can you explain to me how the	10:53:13
24		server market differs from the mobile market	10:53:14
25		for semiconductors?	10:53:17

1 A. Well, I mean, I know enough to
2 know that mobile devices are purchased by
3 individuals. So it's a retail market. The
4 server market is largely not a retail market,
5 so there's going to be a difference in the
6 overall businesses that work in those two
7 adjacent sectors, sub sectors. But that's
8 about the limits of what I know about the
9 details of the differences.

10 Q. And my question is actually
11 specific to the semiconductors that are used in
12 the server market compared to the mobile
13 market. Can you explain that?

14 MS. VAUGHN: Objection to form.

15 A. No. Semiconductors, no.

16 Q. Can you explain how the
17 semiconductors used in the server market differ
18 from the semiconductors used in the large
19 screen computing market?

20 A. No.

21 Q. Do you know, can you explain what
22 [REDACTED]

23 A. [REDACTED]
[REDACTED]
[REDACTED]

1

2

3

4

Q. And from where do you have that information?

A. [REDACTED]

13

14

Q. Can you explain what criteria need to be met in order for something to be [REDACTED]

16

A. No.

17

18

Q. Are you able to describe what criteria need to be met for something to be [REDACTED]

20

MS. VAUGHN: Objection to form.

21

A. No.

22

Q. Do you know technically what [REDACTED]

24

MS. VAUGHN: Objection to form.

25

A. I'm not sure I understand the

1 question. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

5 Q. Do you have any understanding what
6 or can you explain -- strike that.

7 Can you explain technically [REDACTED]

[REDACTED]

9 MS. VAUGHN: Objection to form.

10 A. It -- I don't understand the
11 question. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

15 Q. Technically, do you know if it's
16 possible to create a NuVia design for a core
17 without ARM's ISA?

18 MS. VAUGHN: Objection to form.

19 A. I don't. I assume, without
20 knowing more, that it's possible to develop a
21 core that has something to do with ARM, and
22 that the people who used to be engaged in that
23 in an effort to develop cores could do it
24 without ARM, but beyond that, I don't know.

25 Q. Do you have any understanding

1 technically whether it would be possible to
2 create the cores that NuVia created without the
3 ARM ISA?

4 MS. VAUGHN: Objection to form.

5 A. I don't, no. No, I don't know.

6 Q. Do you know technically whether
7 the cores that were made at NuVia, while it was
8 a stand-alone company, could have been made
9 without a license to the ARM ISA?

10 MS. VAUGHN: Objection to form.

11 A. I don't know. I am aware that
12 some of the specifications for things that rely
13 on an ARM IP are public and made available for
14 anyone who wants to use them. I don't know how
15 far that extends, and I don't know whether that
16 would be sufficient to allow for what you asked
17 me about.

18 Q. Are you able to explain what it
19 means when someone says that [REDACTED]
[REDACTED]
[REDACTED]

22 MS. VAUGHN: Objection to form.

23 A. Other than the English language,
24 no.

25 Q. Can you explain what it means to

1 say that [REDACTED]

3 MS. VAUGHN: Objection to form.

4 A. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

9 Q. Are you relying simply on ordinary
10 English use?

11 A. Yes. I don't have any technical
12 insight into what [REDACTED] would
13 entail if that's what you're asking.

14 Q. Do you have any other insight that
15 you gained from this test as to what it means
16 to do [REDACTED]
[REDACTED]

18 MS. VAUGHN: Objection to form.

19 A. Again, except [REDACTED]
[REDACTED]
[REDACTED]

22 Q. But there you're just relying on
23 the English language, correct?

24 A. I do not have a technical
25 awareness of what [REDACTED]

1 entail.

10:59:17

2 Q. If you can go back to Paragraph 20
3 of your report, Exhibit 1.

10:59:18

10:59:24

4 A. Okay.

10:59:34

5 Q. There are, I believe, six lettered
6 subparagraphs to Paragraph 20, correct?

10:59:35

10:59:37

7 A. Yes.

10:59:39

8 Q. Are all of those opinions meant to
9 be a rebuttal to Mr. Subramanian or Professor
10 Subramanian?

10:59:41

10:59:47

10:59:52

11 A. Yes. The entirety of the report
12 is meant to be a rebuttal to Professor
13 Subramanian, including the six.

10:59:52

10:59:57

11:00:00

14 Q. That is, they are intended to be a
15 criticism of an opinion that you believe Mr.
16 Subramanian has offered or will offer, correct?

11:00:06

11:00:07

11:00:10

17 MS. VAUGHN: Objection to form.

11:00:15

18 A. They're affirmative opinions of
19 mine which I believe rebut opinions that
20 Professor Subramanian offered, and in some
21 cases, yes, they are critical specifically of
22 things, but more generally, they're just also
23 opinions of mine in rebuttal to him.

11:00:15

11:00:22

11:00:25

11:00:26

11:00:29

11:00:32

24 Q. Are any of the six items testimony
25 you would intend to give if Mr. Subramanian or

11:00:34

11:00:45

1

4

To me that's a significant gap in Professor Subramanian's analysis, so I have focused on that, and I have very specifically called that out as a criticism of his work.

8

And so it would, I think, be potentially misleading for me to say, no, I have been not been asked that at all, because that is part of the analysis I've done.

12

But again, to reiterate, to make sure you're getting clear about what I haven't been asked to do, I haven't been asked here's the contract. Do you think that this allows for or requires anything in particular as a freestanding matter.

18

Q. And your report does not contain any opinion on what the requirements of the contract are on that issue in particular?

21

MS. VAUGHN: Objection to form.

22

A. I mean, I quote the contract for context. But otherwise, no.

24

Q. Do you give the affirmative opinion -- so let me back up. You have

25

1 Q. And when you say "I understand
2 from counsel," and then make the statement,
3 this means that you are taking it from counsel
4 and not giving it further independent
5 investigation, correct?

6 A. Correct.

7 Q. So you have not done analysis to
8 reach this conclusion, you are accepting it as
9 an assumption delivered to you by Qualcomm's
10 counsel?

11 MS. VAUGHN: Objection to form.

12 Asked and answered.

13 A. Correct. I'm attempting to be
14 very clear about what I'm, you know, what
15 sources are the basis for my opinions, and the
16 facts on which they rest. I should say, unlike
17 Professor Subramanian.

18 Q. Why did you find this specific
19 example to be meaningful to what you were
20 trying to cover or address in your opinions?

21 MS. VAUGHN: Objection to form.

22 A. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

So it's a specific example of technology

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C E R T I F I C A T E

I, Michael O'Connor, Registered
Merit Reporter/Certified Realtime Reporter,
do hereby certify:

That JOHN C. COATES, the witness
whose testimony is hereinbefore set forth,
was duly sworn by me and that such testimony
is a true and accurate record of my
stenotype notes taken in the foregoing
matter to the best of my knowledge, skill
and ability.

IN WITNESS WHEREOF, I have hereunto
set my hand and Notarial Seal this 19th day
of April 2024.

Michael O'Connor

MICHAEL O'CONNOR, RMR, CRR, CRC

Notary Public

My Commission expires:
November 9, 2029

Exhibit 10

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

Arm Ltd. v. Qualcomm Inc. et al., Case No. 1:22-cv-01146

Expert Rebuttal Report of Prof. John Coates

February 27, 2024

HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY

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I. INTRODUCTION

1. I have prepared this report at the request of Qualcomm Inc., Qualcomm Technologies, Inc., (collectively, “**Qualcomm**”), and NuVia, Inc. (“**NUVIA**”) (collectively, the “**Defendants**”) in connection with *Arm Ltd. v. Qualcomm Inc., et al.*, Case No. 1:22-cv-01146, pending in the United States District Court for the District of Delaware.¹ Specifically, I have been retained by Paul, Weiss, Rifkind, Wharton & Garrison LLP, counsel for the Defendants (“**Paul Weiss**” or “**Counsel**”) to review and assess the opinions expressed by Professor Guhan Subramanian in his expert report (hereinafter, the “**Subramanian Report**”).²

II. QUALIFICATIONS

A. Academic Experience

2. I am the Deputy Dean for Finance and Strategic Initiatives, John F. Cogan Jr. Professor of Law and Economics, and Research Director of the Center on the Legal Profession at Harvard Law School (“**Harvard**”). At Harvard, I teach, among other courses, basic courses on contracts, corporations, partnerships, limited liability companies and other business organizations; and advanced courses on securities law and regulation, financial regulation, corporate governance, and mergers and acquisitions (“**M&A**”), including basic principles of accounting, economics, and finance as they relate to corporate, securities or financial institutions law or the design and implementation of disclosure controls and processes and business transactions. My M&A courses regularly include coverage of customary change-of-control provisions, and my contracts courses regularly include coverage of assignment and anti-assignment customary provisions.

3. I also teach at Harvard Business School and have taught at the Harvard Kennedy School, including courses on finance, corporate governance, and M&A. At both Harvard Law School and Harvard Business School, I teach executive education courses, including courses in which the participants are managing partners of law firms and general counsels of large public and private

¹ Complaint, *Arm Ltd. v. Qualcomm Inc., et al.*, United States District Court for the District of Delaware, Case No. 1:22-cv-01146, Doc. No. 1, August 31, 2022 (“**Complaint**”).

² Expert Report of Professor Guhan Subramanian, December 20, 2023 (“**Subramanian Report**”).

companies, and among the material covered are customary relationships among professionals who work on internal controls and disclosure documents, as well as securities law-based disclosure obligations and processes. Before joining the Harvard faculty in 1997, I taught M&A at New York University and at Boston University. In my courses, I teach students about disclosure requirements, processes, and controls. A copy of my curriculum vitae, including a list of my publications in the last ten years, is attached as **Appendix A**.

B. Prior Work Experience

4. Before joining the Harvard faculty, I was a partner at the New York law firm of Wachtell, Lipton, Rosen & Katz (“**Wachtell Lipton**”), one of the nation’s leading corporate law firms and consistently ranked one or two in American Lawyer’s AmLaw 100. I worked at Wachtell Lipton from 1988 to 1997. In my practice at Wachtell Lipton, I represented large public companies and other firms involved in large financial transactions, including public offerings, private placements, recapitalizations, stock and asset purchases, corporate mergers and acquisitions, business combinations, joint enterprises, and buyouts. I routinely advised parties as to their rights and obligations under relevant securities and corporate laws and regulations, as well as the customs and practices relevant to them. I regularly and personally analyzed, advised about, negotiated, and helped craft disclosures regarding contracts, including those with change-of-control and anti-assignment provisions, particularly in the context of proposed or possible future M&A transactions. I also provided securities law and practice advice and services on an array of registered and exempt securities offerings, including working for Goldman Sachs & Co. on approximately \$7.4 billion of debt and equity financings by Sears, Roebuck and Co., as well as for J.P. Morgan, Credit Suisse First Boston, Morgan Stanley, and other investment banks working for large domestic and foreign companies issuing securities. In many offerings, change in control provisions were included or considered.

5. In 2021, I served as the General Counsel of the U.S. Securities and Exchange Commission (“**SEC**”), and as Acting Director of the SEC’s Division of Corporation Finance. In those capacities, I oversaw the legal functions of the SEC, including advising the Chair and the other Commissioners on a range of legal issues, including issues related to M&A. Those issues arose in the context of regulation, policy statements, speeches, staff interpretations and guidance,

Congressional testimony, enforcement matters, and litigation, both at trial and in appeals.

C. Consulting and Litigation Experience

6. Since joining Harvard, I have provided or am providing paid or unpaid consulting services to the U.S. Department of Justice (“**DOJ**”), the U.S. Department of the Treasury, the Office of the White House Counsel, the SEC, the Public Company Accounting Oversight Board (“**PCAOB**”), the New York Stock Exchange (“**NYSE**”), members, subcommittees and staff of the U.S. Senate and House of Representatives and the Board of Governors of the Federal Reserve System, and organizations and individuals actively involved in corporate and financial transactions, including private equity funds, mutual funds, hedge funds, public and private companies, law firms, investment and commercial banks, regulatory agencies, trade organizations, and entrepreneurs. In my consulting, I have addressed M&A contracts, customs, norms, negotiations, and processes, among other topics. I served on the Investor Advisory Committee of the SEC and as an independent monitor of and compliance consultant for a large, publicly traded company for the DOJ.

7. I have testified as an expert witness 25 times at trial and more than 80 times by deposition, including multiple arbitrations. My testimony has been on behalf of both plaintiffs or claimants and defendants or respondents. I have testified in disputes in federal and state courts concerning M&A and corporate governance. I have never been disqualified as an expert in the fields in which I was proposed to give testimony. A list of cases in which I have testified or been deposed as an expert in the previous four years is attached as **Appendix B**.

D. Publications, Speaking Engagements, and Affiliations

8. I have studied and written extensively about securities law and regulation, corporate law and disclosure issues, financial markets and financial regulation, and the law and economics of corporate transactions, as well as the contracts and customs and practices of businesspersons and lawyers relevant to such topics.

9. My articles have appeared, or are forthcoming, in top journals, both peer-reviewed and non-peer-reviewed, including *Yale Law Journal*, *Harvard Business Law Review*, *Yale Journal on Regulation*, *Stanford Law Review*, *California Law Review*, *University of Pennsylvania Law*

Review, *Texas Law Review*, *Journal of Corporation Law*, *Business Lawyer*, *Accounting Horizons*, *Journal of Economic Perspectives*, *Journal of Legal Analysis*, *Journal of Accounting Research*, *Law and Contemporary Problems*, and *Journal of Empirical Legal Studies*. A number of courts have cited several of my articles. For example, see *Higginbotham v. Baxter Int'l Inc.*, 495 F.3d 753, 760 (7th Cir.), citing John C. Coates, "The Goals and Promise of the Sarbanes-Oxley Act," 21 *J. Econ. Perspectives* 91, 101–08, Winter 2007; *Union Illinois 1995 Inv. Ltd. Partnership v. Union Financial Group, Ltd.*, 847 A.2d 340, 356 n.35 (Del. Ch. 2004), citing John C. Coates, "'Fair Value' as an Avoidable Rule of Corporate Law: Minority Discounts in Conflict Transactions," 147 *U. Pa. L.Rev.* 1251, 1999; *In re TransPerfect Global, Inc.*, 2018 WL 904160, at *23 n.174 (Del. Ch. 2018), citing John C. Coates, "The Powerful and Pervasive Effects of Ownership on M&A," Working Paper, June 2, 2010.

10. I have been invited to be a speaker at the SEC, the Commodity Futures Trading Commission, the PCAOB, the Federal Reserve Board, and the Federal Reserve Bank of New York; the law schools or faculties of University of Oxford, Yale University, Stanford University, New York University, Columbia University, University of Chicago, University of Pennsylvania, University of Texas, University of California, Berkeley, University of Virginia, Northwestern University, and Georgetown University, among others; Harvard Business School, the Stern School of Business at New York University, the University of Chicago Booth School of Business, the Wharton School, and the MIT Sloan School of Management; the Federal Judicial Center, American Law Institute, American Bar Association, Boston Bar Association, International Bar Association, American Association of Law Schools, and the American Law and Economics Association; the National Bureau of Economic Research; the Mutual Fund Directors Forum; the Royal College of Spain, and the High Level Group of Corporate Law Experts established under the auspices of the European Union. I am or have been a member of the Legal Advisory Committee to the New York Stock Exchange, the American Bar Association, the American Association of Law Schools, the American Law Institute, the American Finance Association, and the board of directors of the American Law and Economics Association.

11. I will receive my customary fee of \$2,250 per hour in this matter. I have been assisted in this matter by staff of Cornerstone Research, who worked under my direction. I receive compensation from Cornerstone Research based on its collected staff billings for its support of me

in this matter. Neither my compensation in this matter nor my compensation from Cornerstone Research is in any way contingent or based on the content of my opinion or the outcome of this or any other matter.

12. I reserve the right to amend or supplement my opinions and report, if appropriate, based on any developments, including any additional discovery, in this case.

III. ASSIGNMENT AND SUMMARY OF OPINIONS

13. I understand that the dispute in this case relates to certain license agreements between Arm Ltd. (“**ARM**”) and NUVIA, specifically, the Architecture License Agreement (“**NUVIA ALA**”) and Technology License Agreement (“**NUVIA TLA**”), which were signed in 2019, and ARM’s termination of those agreements, effective March 1, 2022, more than a year after the announcement of Qualcomm’s acquisition of NUVIA in January 2021.³

14. In the Complaint, ARM asserts that the termination provisions in the NUVIA ALA required Qualcomm and NUVIA to “stop using and to destroy the relevant Nuvia technology,” as well as to stop using ARM’s trademarks with their related products.⁴ I understand that ARM seeks declaratory judgment and injunctive relief in part on the ground that “prospective monetary damages from Qualcomm’s [acts] are not readily ascertainable or calculable,”⁵ while also seeking damages for the use of ARM’s trademarks in connection with semiconductor chips incorporating the relevant NUVIA technology.⁶

15. I understand Qualcomm has asserted a counterclaim against ARM for certain declaratory judgments, including that (a) Qualcomm and/or NUVIA did not breach the NUVIA ALA and/or TLA; and (b) after Qualcomm’s acquisition of NUVIA, Qualcomm’s architected cores and various Systems on a Chip (“**SoCs**”) are fully licensed under Qualcomm’s ALA and TLA.⁷

³ Complaint, ¶¶ 21, 28, 39.

⁴ Complaint, ¶ 3.

⁵ Complaint, ¶¶ 3, 56.

⁶ Complaint, ¶ 3.

⁷ Defendants’ Answer and Defenses to Plaintiff’s Complaint and Jury Demand and Defendants’ Counterclaim, *Arm Ltd. v. Qualcomm Inc., et al.*, United States District Court for the District of Delaware, Case No. 1:22-cv-01146, Doc. No. 18, October 26, 2022 (hereinafter, “**Defendants’ Answer and Defenses to Plaintiff’s Complaint**”), ¶ 259.

16. To form my opinions, I have reviewed Professor Subramanian's report and the materials cited in his report, including transcripts of deposition testimony in this matter, as well as additional relevant materials that Professor Subramanian did not consider, including transcripts of other depositions and produced documents. A full list of the materials considered is attached as **Appendix C**.

17. In the course of my review of the record in this matter, I considered facts and statements of facts, although I offer no opinions on such facts. The facts that I assumed—summarized in Section IV below—include a description of the history, characteristics, and negotiation process between ARM and NUVIA for purposes of NUVIA's ALA and NUVIA's TLA. It is undisputed that Qualcomm and ARM negotiated and executed separate license agreements; namely, the **"Qualcomm ALA"** and **"Qualcomm TLA."** Counsel has instructed me to assume that the Qualcomm ALA covered the same—and broader—technology than that licensed under the NUVIA ALA.

18. Based on this review and these assumptions, as well as my academic and professional experience from over thirty years of working on, researching, and teaching about, M&A transactions, I reached several opinions that rebut Professor Subramanian's report.

19. Professor Subramanian tries to use principles of negotiation theory and transactional practice to interpret a contract in a way that would usurp the role of the court to interpret the contract. Similarly, Professor Subramanian seems to offer opinions about the intentions of the parties and applicability of the license agreements, which are issues for the court to decide. In my opinions, I respond to Professor Subramanian's opinions and statements, but do not intend to suggest that experts should opine on legal issues of contract interpretation or the intentions of parties in a dispute.

20. With that note, my opinions are as follows:

- A. Professor Subramanian's analysis and application of negotiation theory does not support the conclusion that the NUVIA and Qualcomm ALAs are "not interchangeable in terms of business intentions and applicability." In fact, Professor Subramanian does not provide sufficient support for his conclusion that ARM's ALAs were subject to individualized negotiations and reflect the parties' full and

accurate business intentions. Moreover, Professor Subramanian does not consider the rights granted by ARM to Qualcomm in its ALA.

- B. The fact that Qualcomm sought ARM's consent to assign NUVIA's license agreements does not indicate that consent was required in order to develop NUVIA technology.
- C. Professor Subramanian's analysis of "change in control" provisions is disconnected from the facts of this case and blurs customary differences between "change in control" and "anti-assignment" provisions.
- D. Professor Subramanian provides no support for his conclusion that the NUVIA ALA requires Qualcomm to discontinue the use of the technology acquired from NUVIA.
- E. Professor Subramanian does not provide any basis for concluding that damages would be "virtually impossible to quantify."
- F. Professor Subramanian relies on additional assumptions or assertions that render his analysis incomplete and unreliable.

IV. FACTUAL BACKGROUND

A. NUVIA's License Agreements with ARM

21. Around the end of February 2019, Gerard Williams III, NUVIA's then-CEO, President, and co-Founder, initiated discussions with Simon Segars, ARM's then-CEO.⁸ NUVIA, a start-up working on a custom central processing unit ("CPU") and a "system on a chip" ("SoC") for the server market,⁹ and ARM, a provider of processor architecture and designs,¹⁰ entered into a non-

⁸ Email chain from Gerard Williams III (NUVIA) to Simon Segars (ARM), "Re: talk," February 26, 2019, QCARM_2422447-448 at QCARM_2422448.

⁹ Mark Tyson, "Nuvia 'clean-sheet CPU design' performance previewed," *Hexus*, August 11, 2020, available at <https://hexus.net/tech/news/cpu/144733-nuvia-clean-sheet-cpu-design-performance-previewed/> (Last visited on February 23, 2024); Defendants' Answer and Defenses to Plaintiff's Complaint, ¶¶ 9-10.

¹⁰ "The ARM processor business model," *Arm*, available at <https://developer.arm.com/documentation/dht0001/a/architectures--processors--and-devices/the-arm-processor-business-model> (Last visited on February 23, 2024).

disclosure agreement (“NDA”) on March 19, 2019,¹¹ and began discussing [REDACTED]

22. On April 18, 2019, ARM sent NUVIA a draft of an ALA.¹³ An ARM ALA g [REDACTED]

[REDACTED] Under an ARM ALA, ARM does not [REDACTED]

[REDACTED] Also under an ARM ALA, [REDACTED]

23. As specified in the draft Annex 1 to the NUVIA ALA, NUVIA was [REDACTED]

[REDACTED] And the draft NUVIA ALA [REDACTED]

24. In June 2019, NUVIA engineers met with ARM. After that meeting, ARM provided feedback on the ALA and v8 Annex,¹⁸ and it also [REDACTED]

¹¹ Email chain from Matthew Gretton-Dann (ARM) to Gerard Williams III (NUVIA) et al., “Re: NDA between NuVia Inc and Arm,” March 19, 2019, ARM_00058411–412; Non Disclosure Agreement Between ARM Limited and NUVIA, Inc., March 19, 2019, ARM_00058413–417.

¹² [REDACTED], QCARM_0002581–585 at QCARM_0002582.

¹³ Email from Tim Herbert (ARM) to Gerard Williams III (NUVIA), “Subject: Architecture license agreement and v8A annex,” April 18, 2019, QCARM_3315932; Draft Technology License Agreement (“ALA”) Between ARM Limited and NUVIA, Inc., April 16, 2019, ARM_00002358–373.

¹⁴ Deposition of Tim Herbert, October 25, 2023, pp. 37:8–38:13; Deposition of Paul Williamson, November 9, 2023, pp. 20:9–21, 23:24–24:2.

¹⁵ See, e.g., [REDACTED] of Draft Technology License Agreement (“ALA”) Between ARM Limited and NUVIA, Inc., April 16, 2019, ARM_00002358–373 at ARM_00002362; Section 2.9 of Amended and Restated Architecture License Agreement Between ARM Limited and Qualcomm Global Trading, PTE, LTD, May 30, 2013, ARM_00044650–692 (hereinafter, “Qualcomm ALA”) at ARM_00044656.

¹⁶ Email from Tim Herbert (ARM) to Gerard Williams III (NUVIA) et al., “Subject: Architecture license agreement and v8A annex,” April 18, 2019, QCARM_3315932; Draft of Annex 1 to the Architecture License Agreement Between ARM Limited and NUVIA Inc., April 18, 2019, ARM_00002374–388 at ARM_00002377–378; Annex 1 to the Architecture License Agreement Between ARM Limited and NUVIA Inc., March 27, 2020, ARM_00057230–243 at ARM_00057234–235.

¹⁷ Draft Technology License Agreement (“ALA”) Between ARM Limited and NUVIA, Inc., April 16, 2019, ARM_00002358–373 at ARM_00002362. See also Technology License Agreement (“ALA”) Between ARM Limited and NUVIA, Inc., September 27, 2019, ARM_00059183–199 (hereinafter, “NUVIA ALA”) at ARM_00059187.

¹⁸ Email chain from [REDACTED] Gerard Williams III (NUVIA), June 18, 2019, QCARM_2420399–401.

[REDACTED]

[REDACTED] In a June 17, 2019 email, NUVIA’s co-Founder Manu Gulati commented that [REDACTED] During the ensuing discussions, Mr. Williams noted in a June 19, 2019 email that [REDACTED]

²¹

¹ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

25. On June 21, 2019, Mr. Williams proposed a [REDACTED]” to Tim Herbert (former VP of North American Sales at ARM)²³ that [REDACTED]

[REDACTED]⁴ Under such a model, NUVIA [REDACTED]

[REDACTED] Later, on July 12, 2019, Mr. Williams [REDACTED]

[REDACTED] In an

¹⁹ [REDACTED]

[REDACTED]

[REDACTED]

²² *Id.*

²³ Deposition of Tim Herbert, October 25, 2023, pp. 15:24–16:1.

²⁴ Email from Gerard Williams III (NUVIA) to Tim Herbert (ARM), “Re: License payment model,” June 21, 2019, QCARM_0020012.

²⁵ Email from Gerard Williams III (NUVIA) to Tim Herbert (ARM), “Re: License payment model,” June 21, 2019, QCARM_0020012.

²⁶ Email from Gerard Williams III (NUVIA) to Tim Herbert (ARM), “Re: License payment model,” July 12, 2019, ARM_00025914–917 at ARM_00025914. *See also* Email from Tim Herbert (ARM) to Gerard Williams III (NUVIA), “Re: License payment model,” July 13, 2019, QCARM_3835058–061 at QCARM_3835058.

August 9, 2019 email, Mr. Williams [REDACTED]

26. Through September 2019, ARM and NUVIA continued to negotiate [REDACTED]

[REDACTED]²⁸

27. On September 27, 2019, NUVIA and ARM agreed on terms and entered into an ALA,²⁹ under which [REDACTED]

28. Section [REDACTED] of the NUVIA ALA included [REDACTED]

29. Under Section [REDACTED] of the NUVIA ALA, [REDACTED]

²⁷ Email from Gerard Williams III (NUVIA) to Christine Cong Tran and Tim Herbert (ARM) et al., “Subject: ALA discussion,” August 9, 2019, ARM_00026308–310. *See also* ARM Presentation, “Nuvia. Licensing Discussion,” August 26, 2019, QCARM_3314368–373.

²⁸ *See, e.g.*, [REDACTED], QCARM_0213867–868 at QCARM_0213867; Email chain from Will Abbey (ARM) to Todd Lepinski and Tim Herbert (ARM), “Re: Pricing...,” September 17, 2019, ARM_00037458–461 at ARM_00037458–459.

²⁹ Email chain from Will Abbey (ARM) to Gerard Williams III (NUVIA) et al., “Re: A big Thank You,” September 30, 2019, ARM_00003124. *See also* Deposition of Tim Herbert, October 25, 2023, pp. 119:18–121:12 ([REDACTED]).

³⁰ Defendants’ Answer and Defenses to Plaintiff’s Complaint, ¶ 185.

³¹ NUVIA ALA, ARM_00059183–199 at ARM_00059197.

³² NUVIA ALA, ARM_00059183–199 at ARM_00059196.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

³³ NUVIA ALA, ARM_00059183–199 at ARM_00059196.

³⁴ NUVIA ALA, ARM_00059183–199 at ARM_00059183; Deposition of Paul Williamson, November 9, 2023, p. 18:19–25 (“So ARM technology could be a very broad term or it could mean something very specific in terms of an individual contract. In the case as I was just trying to give context to the discussion, I was referring to anything that would be associated with the contract which Nuvia held with ARM.”).

[REDACTED]⁵

31. The NUVIA ALA also defined the term [REDACTED]
[REDACTED]

32. Upon termination, ARM was obligated to [REDACTED]
[REDACTED]
[REDACTED]

33. ARM and NUVIA also entered into a TLA,³⁸ [REDACTED]
[REDACTED]
[REDACTED]⁹

34. I understand that the royalty rates are generally lower under ARM's ALAs than under its TLAs.⁴⁰

B. Qualcomm's License Agreements with ARM

35. Many years prior to negotiation between NUVIA and ARM, and thus before Qualcomm's

³⁵ NUVIA ALA, ARM_00059183–199 at ARM_00059183.

³⁶ NUVIA ALA, ARM_00059183–199 at ARM_00059185.

³⁷ NUVIA ALA, ARM_00059183–199 at ARM_00059196.

³⁸ Complaint, ¶ 21.

³⁹ Complaint, ¶ 17.

⁴⁰ Defendants' Answer and Defenses to Plaintiff's Complaint, ¶ 19. *See also* Deposition of Will Abbey, October 27, 2023, p. 92:4–9 ("[REDACTED]

acquisition of NUVIA, Qualcomm had entered into its own ALA and TLA with ARM.⁴¹

36. Qualcomm's current ALA was executed in May 2013. It was (and remains) a binding obligation of ARM's, separate from the license agreements signed by NUVIA and ARM in 2019.⁴²

37. I understand from Counsel that, like the NUVIA ALA, [REDACTED]

[REDACTED]. In addition, [REDACTED]

38. Among other provisions, the Qualcomm ALA [REDACTED]

39. Under that agreement, [REDACTED]

C. Qualcomm's Acquisition of NUVIA

40. Prior to Qualcomm announcing the acquisition of NUVIA in January 2021, NUVIA had

⁴¹ Qualcomm's original ALA was entered into on September 29, 2003. *See* Qualcomm ALA, ARM_00044650–692 at ARM_00044650. Qualcomm's original TLA was entered into on September 30, 1997. *See* Technology License Agreement Between ARM Limited and Qualcomm Global Trading PTE, LTD., May 30, 2013, ARM_00103918–972 at ARM_00103918.

⁴² Qualcomm ALA, ARM_00044650–692 at ARM_00044650; Deposition of Paul Williamson, November 9, 2023, p. 61:6–24.

⁴³ Defendants' Answer and Defenses to Plaintiff's Complaint, ¶ 13; Email chain from Cristiano Amon (Qualcomm) to Simon Segars (ARM), "RE: Moving forwards," June 21, 2021, ARM_00026976–978 at ARM_00026976.

⁴⁴ Qualcomm ALA, ARM_00044650–692 at ARM_00044651–652.

⁴⁵ Qualcomm ALA, ARM_00044650–692 at ARM_00044677.

⁴⁶ Master Royalty Schedule Between Qualcomm Global Trading PTE, LTD. and ARM Limited, May 30, 2013, ARM_01298891–929; Annex 1 to the Amended and Restated Architecture License Agreement Between ARM Limited and Qualcomm Global Trading, PTE, LTD, May 30, 2013, QCARM_0343120–142 at QCARM_0343139; v8 Next Architecture Annex to the Amended and Restated Architecture License Agreement Between ARM Limited and Qualcomm Global Trading, PTE, LTD, May 30, 2013, QCARM_0338573–576 at QCARM_0338576.

worked on a custom CPU known as the Phoenix Core and on a custom SoC that incorporated multiple Phoenix Cores for use in data centers and servers. NUVIA's CPU and SoC were being designed to be ARM-architecture compatible.⁴⁷

41. On January 12, 2021, Qualcomm announced the acquisition of NUVIA by Qualcomm Technologies, a subsidiary of Qualcomm.⁴⁸ In the acquisition announcement, Qualcomm indicated that CPUs incorporating technology begun at NUVIA would be "expected to be integrated across Qualcomm Technologies' broad portfolio of products."⁴⁹ Specifically, Qualcomm intended to use the technology NUVIA had started developing to build high-volume, lower cost SoCs for Qualcomm's traditional markets, such as mobile and computing markets.⁵⁰

42. In a January 27, 2021 letter to Paul Williamson (VP, General Manager Client Line of Business at ARM) by Ziad Asghar (VP, Product Management at Qualcomm), [REDACTED]

[REDACTED]

43. Following Qualcomm's notification to ARM, Mr. Williamson and Mr. Asghar exchanged letters on February 2, February 3, February 16, February 18, February 25, March 2, and March 14, 2021. Specifically, on February 2, 2021, ARM asserted that "[REDACTED]

[REDACTED]

⁴⁷ Defendants' Answer and Defenses to Plaintiff's Complaint, ¶¶ 9–10.

⁴⁸ Qualcomm Press Release, "Qualcomm to Acquire Nuvia," January 12, 2021, available at <https://www.qualcomm.com/news/releases/2021/01/qualcomm-acquire-nuvia> (Last visited on February 23, 2024). As discussed in Section I, I refer to Qualcomm Inc. and Qualcomm Technologies collectively as "Qualcomm" in this report.

⁴⁹ *Id.*

⁵⁰ Defendants' Answer and Defenses to Plaintiff's Complaint, ¶ 26.

⁵¹ [REDACTED]

⁵² *Id.*

⁵³ [REDACTED]

[REDACTED]

44. On February 3, 2021, Qualcomm requested ARM to promptly send the [REDACTED] [REDACTED] it was proposing entering and to clarify the purpose or need for another commercial agreement, given that Qualcomm had already an ALA and TLA with ARM.⁵⁵ Qualcomm also wrote that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

45. On February 16, 2021, ARM proposed that, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁵⁴ *Id.*

⁵⁵ [REDACTED]

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ [REDACTED]

⁵⁹ *Id.*

⁶⁰ *Id.* Deposition of Paul Williamson, November 9, 2023, pp. 76:22–77:16 (“

[REDACTED]

[REDACTED]

46. On February 18, 2021, Qualcomm replied to ARM's proposal that there were "[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

47. Qualcomm went on to say: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

48. Qualcomm reiterated its position in a subsequent letter dated February 25, 2021.⁶⁵ In that letter, Mr. Asghar stated that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

49. On March 2, 2021, ARM replied that [REDACTED]

61 [REDACTED]

62 [REDACTED]

63 *Id.*

64 *Id.*

65 [REDACTED]

66 [REDACTED]

[REDACTED] ("...

[REDACTED]

[REDACTED]

[REDACTED]

50. In a letter dated March 14, 2021, Qualcomm requested that, given the impending acquisition, ARM provide [REDACTED]

[REDACTED]

[REDACTED]

51. I understand that [REDACTED]

[REDACTED]

D. Post-Acquisition Events and Termination of NUVIA's License Agreements

52. The acquisition of NUVIA closed on March 15, 2021; no assignment decision was reached between ARM and Qualcomm by the closing of the acquisition.⁶⁹ Upon closing of the acquisition, I understand, based on my discussion with Larissa Cochran at Qualcomm, that Qualcomm paid the remaining license fees that ARM was owed under the NUVIA ALA.⁷⁰

53. In an internal email, ARM's then-CEO, Mr. Segars, commented on March 16, 2021:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]⁷¹

54. After the closing of the acquisition, Qualcomm and ARM continued to communicate. Mr. Segars and ARM's then-President of IP Products Groups, Rene Haas, exchanged emails with

⁶⁷ [REDACTED]

⁶⁸ [REDACTED]

⁶⁹ Defendants' Answer and Defenses to Plaintiff's Complaint, ¶ 28.

⁷⁰ [REDACTED] See QCARM_3839896-911 at QCARM_3839906. [REDACTED]

⁷¹ Deposition of Simon Segars, November 16, 2023, Exhibit QX110, ARM_00081374 (emphasis added).

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55. On

56.

57.

also noted that, “[

72

[REDACTED]

58. [REDACTED]

[REDACTED] “ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] 82 [REDACTED]

[REDACTED]

[REDACTED] 83

59. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

60. In an internal exchange, on May 27, 2021, Mr. Haas and Mr. Williamson agreed to

78 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]⁸⁶

61. [REDACTED]
[REDACTED], [REDACTED]
[REDACTED] The
counterproposal also included a [REDACTED]
[REDACTED]
[REDACTED] ARM also noted that the [REDACTED]
[REDACTED]⁹⁰ ARM's internal
documents indicated that [REDACTED].⁹¹
ARM's analyses [REDACTED]

62. [REDACTED]
[REDACTED]
[REDACTED]: [REDACTED]
[REDACTED]
[REDACTED]³ [REDACTED]

⁸⁶ [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ For example, in a May 2019 spreadsheet that was created prior to the execution of the NUVIA ALA and TLA, ARM [REDACTED]

⁹² See Email from Tim Herbert (ARM) to Leeor Mamou (ARM) et al., [REDACTED]

[REDACTED] See also Email from Ivan Knez (ARM) to Andrew Howard (ARM), "May 26, 2021, ARM_01294035-037 at ARM_01294036 ("Note [REDACTED]

⁹³ [REDACTED]
[REDACTED]

[REDACTED]

[REDACTED] 94 [REDACTED]

[REDACTED] [REDACTED]

[REDACTED] 5 [REDACTED]

63. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

64. [REDACTED]

[REDACTED]

65. [REDACTED]

-
- [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

-
- [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]

[REDACTED] That was the last relevant communication that I am aware of between ARM and Qualcomm before ARM terminated the NUVIA ALA and TLA.

68. On February 1, 2022, ARM sent NUVIA a notice stating that ARM was terminating the NUVIA ALA and TLA (effective March 1, 2022)—more than one year after the announcement of Qualcomm’s acquisition of NUVIA—due to the purported breach of the assignment provisions ([REDACTED]) of the NUVIA ALA and TLA by entering into the acquisition of NUVIA by Qualcomm without ARM’s consent.¹¹¹ ARM also asserted that NUVIA violated confidentiality provisions under Section [REDACTED] of the NUVIA license agreements and made unlicensed use of ARM’s confidential information in violation of Section [REDACTED].¹¹² Moreover, ARM demanded that NUVIA [REDACTED] [REDACTED] Specifically, ARM stated that NUVIA had to:

1. Immediately discontinue any use and distribution of all Arm Technology,

[REDACTED]

[REDACTED]

[REDACTED]

110

[REDACTED]

[REDACTED] (“

[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

71. On August 31, 2022, ARM filed a complaint alleging violations of the termination provisions that ARM claims required “Qualcomm and Nuvia to stop using and to destroy the relevant Nuvia technology and to stop their improper use of Arm’s trademarks with their related products.”¹¹⁷

72. ARM seeks declaratory judgment and injunctive relief in part on the ground that “prospective monetary damages from Qualcomm’s [acts] are not readily ascertainable or calculable, given the resulting future impact on Arm’s relationships with existing and prospective customers.”¹¹⁸

73. At the same time, ARM seeks damages for the use of ARM’s trademarks in connection with semiconductor chips incorporating the relevant NUVIA technology.¹¹⁹

V. OPINIONS

A. Professor Subramanian’s Analysis and Application of Negotiation Theory Does Not Support the Conclusion That the NUVIA and Qualcomm ALAs Are “Not Interchangeable in Terms of Business Intentions and Applicability.”

74. Professor Subramanian asserts that both the NUVIA and Qualcomm ALA were “the

¹¹⁴ Letter from Carolyn Herzog (ARM) to Gerard Williams III (NUVIA), February 1, 2022, ARM_00037427.

¹¹⁵ Letter from Ann Chaplin (Qualcomm) to Spencer Collins (ARM), April 1, 2022, ARM_01241282–283 at ARM_01241283.

¹¹⁶ See Arm v8 Compliance Waiver for Phoenix CPU Core, ARM, April 12, 2022, ARM_00068711–740 at ARM_00068711 (“This compliance waiver forms the acceptance from Arm that Qualcomm Global Trading Pte Ltd has validated their CPU Core in accordance with the Verification requirements set out in the Architecture agreement.”). See also Defendants’ Answer and Defenses to Plaintiff’s Complaint, ¶ 38.

¹¹⁷ Complaint, ¶ 3.

¹¹⁸ Complaint, ¶ 56.

¹¹⁹ Complaint, ¶¶ 3, 79–80.

product of negotiations between the parties” and as such “each reflects the deliberate intentions and expectations of Qualcomm or Nuvia, respectively” and “the two contracts are . . . not interchangeable in terms of business intentions and applicability.”¹²⁰

75. To reach this conclusion, Professor Subramanian states that he relies on principles of negotiation theory and transactional practice.¹²¹ In my experience, negotiation theory and transactional practice are not relevant in a contract dispute because a contract dispute is centered on the contract as written.

76. Negotiation theory is directed at understanding the strategies and processes through which individuals or companies make decisions when entering agreements or navigating disputes.¹²² Consideration of negotiation theory may guide negotiators to better outcomes or help make sense of parties’ motivations and thought processes in negotiations.¹²³ I do not understand negotiation theory to supply the meaning of contracts after they have been agreed to by parties or provide evidence on the facts of what happened in an actual contract negotiation.¹²⁴ I respond here only to the extent that Professor Subramanian’s opinions are considered admissible on these points.

77. Moreover, Professor Subramanian’s assertion is overly broad and fails to consider in any meaningful way the nature of the rights granted in the Qualcomm ALA, how they overlap with those granted in the NUVIA ALA, and how those overlapping rights reflect the “intentions and expectations”¹²⁵ of ARM, the common counterparty.

78. Based on my experience and review of materials in this matter, Professor Subramanian’s failure to adequately consider this issue renders his analysis inadequate and his conclusions mistaken, as evaluating the overlapping rights granted in the NUVIA and Qualcomm ALAs is a necessary consideration in order to conclude (or assume) that assignment of the NUVIA ALA was

¹²⁰ Subramanian Report, ¶¶ 63, 65.

¹²¹ Subramanian Report, ¶¶ 52, 84, 86.

¹²² Leigh L. Thompson, *Negotiation Theory and Research*, (New York, NY: Psychology Press, 2006), pp. 1–6.

¹²³ See Harvard Law School, The Program on Negotiation, “What is Negotiation Theory?”, available at <https://www.pon.harvard.edu/tag/negotiation-theory> (noting that the academic center for which Professor Subramanian is faculty chair defines negotiation theory as a guide for negotiators with a focus on better outcomes, not a source for contract interpretation.) (Last visited on February 23, 2024).

¹²⁴ Leigh L. Thompson, *Negotiation Theory and Research*, (New York, NY: Psychology Press, 2006), pp. 1–6.

¹²⁵ Subramanian Report, ¶ 63.

required for Qualcomm to continue developing NUVIA technology.

1. Professor Subramanian’s Generalizations about ARM’s ALAs Are Not Supported.

79. As an initial matter, Professor Subramanian asserts that ARM’s ALAs “were subject to individualized negotiations” and were “carefully reviewed to ensure that they reflect the full and accurate business intentions of the parties.”¹²⁶ Professor Subramanian undertook no methodical analysis to make this determination.

80. Professor Subramanian states that his conclusions are rooted in “standard business practice for all contracts,”¹²⁷ in addition to his review of a limited subset of documentary and witness evidence. But Professor Subramanian never identifies what “standard business practice for all contracts” he is referring to, nor does he outline his methodology for arriving at that set of “standard business practice[s] for all contracts,” or any other explanation regarding “standard business practice for all contracts,”¹²⁸ making his analysis and conclusions unreliable. M&A contracts, for example, customarily consist not only of highly individualized terms, but also of “constrained boilerplate,” in which parties mix and match variants of standardized language, and commonly do not negotiate customized or individualized terms.¹²⁹

81. Additionally, the record evidence Professor Subramanian relies on does not support his conclusion. Professor Subramanian quotes testimony from Tim Herbert (former VP of North American Sales at ARM)¹³⁰ that all of “[t]he Arm customers that [he] dealt with” typically negotiated and customized ARM’s template ALA language.¹³¹ Professor Subramanian’s reliance on Mr. Herbert’s testimony is called into question by Mr. Herbert’s acknowledgement in the very

¹²⁶ Subramanian Report, ¶ 52.

¹²⁷ Subramanian Report, ¶ 52.

¹²⁸ See, e.g., Stephen J. Choi and G. Mitu Gulati, “Contract as Statute,” *Michigan Law Review* 104, no. 5, 2006, pp. 1129–1174 at p. 1130 (“Not all contracts and contract terms are individually negotiated. Standard-form or boilerplate contracts are common in the commercial world.”).

¹²⁹ John Coates, “M&A Contracts: Purposes, Types, Regulation, and Patterns of Practice,” Working Paper, 2015, p. 6 (“[T]he bulk of the content of M&A contracts can be fairly described as boilerplate exhibiting constrained variation. Only a small number of terms are truly deal-specific terms.”).

¹³⁰ Deposition of Tim Herbert, October 25, 2023, pp. 15:24–16:1.

¹³¹ Subramanian Report, ¶ 52, n. 75.

passage Professor Subramanian cites that, in his 12 years at ARM, he has only negotiated one ALA and one extension to an existing ALA, which shows that it is not possible to draw conclusions about all ARM ALA negotiations from Mr. Herbert's testimony.¹³²

82. Professor Subramanian also reviewed nine of ARM's at least 17 ALAs with parties other than Qualcomm and NUVIA that are listed on ARM's ALA redaction log.¹³³ It is not clear why Professor Subramanian chose not to review *all* ARM's ALAs or how he selected the ALAs he reviewed. Additionally, the copies of ARM's ALAs that Professor Subramanian listed as considered for his report (and thus the copies he presumably reviewed) are redacted and incomplete. In particular, they do not include the Annex 1 associated with each contract, which I understand contains information about the scope of licensed technology, the license grant, and the negotiated license and royalty fees that Professor Subramanian considers as "key [contract] provisions."¹³⁴ My understanding from counsel is that ARM has not produced unredacted versions of these contracts. Because I have not been able to review those provisions, I am unable to evaluate

¹³² *Id.* See also Deposition of Tim Herbert, October 25, 2023, pp. 55:20–25 (“Q. And in your 12 years at Arm, you only negotiated one ALA? A. I negotiated one extension, and I negotiated one new . . . fresh ALA.”), 58:4–6.

¹³³ See Subramanian Report, Appendix B - 2–3 (listing nine agreements apart from those with Qualcomm and NUVIA); ARM's Second Supplemental ALA Redaction Log, December 26, 2023 (containing agreements between ARM and 17 third parties); ARM's Third Supplemental ALA Redaction Log, January 5, 2024 (containing agreements between ARM and 17 third parties). Moreover, the nine ALAs that Professor Subramanian considered were not produced in their entirety. See Architecture License Agreement (ALA) Between ARM Limited and Infineon Technologies AG, November 5, 2009, ARM_01246021–042; Architecture License Agreement (ALA) Between ARM Limited and Samsung Electronics Company Limited, October 16, 2012, ARM_01246043–066; Technology License Agreement (ALA) Between ARM Limited and Advanced Micro Devices, Inc., October 31, 2013, ARM_01245673–703; Technology License Agreement (ALA) Between ARM Limited and Fujitsu Limited, October 17, 2014, ARM_01246135–157; Second Amended Technology License Agreement (TLA) Between ARM Limited and Avago Technologies General IP PTE. LTD., October 17, 2016, ARM_01245979–6020; Amended Architecture License Agreement (ALA) Between ARM Limited and Microsoft Corporation, March 23, 2017, ARM_01245794–813; Architecture License Agreement (ALA) Between ARM Limited and Ampere Computing LLC, February 3, 2018, ARM_01246067–085; Architecture License Agreement (ALA) Between ARM Limited and Google LLC, June 30, 2021, ARM_01245727–755; Technology License Agreement Between ARM Limited and NVIDIA Corporation, March 30, 2005, ARM_01240449–469.

¹³⁴ Subramanian Report, ¶¶ 59–62. See also Subramanian Report, ¶ 83; Deposition of Tim Herbert, October 25, 2023, pp. 116:18–24 (“[W]ith an architectural license agreement, you need to have an annex for the specific version of the architecture that's being licensed. So the – the ALA is the overall governing document. And the annex would be something like the v8-A annex or the v9-A annex”), 118:4–18 (“Q. Does the annex provide a description of IP that's licensed in connection with the ALA? A. It would include -- it -- it does include a list of deliverable -- deliverables that are associated with that particular version. Q. So you could look at an annex and from looking at the annex, understand all of the deliverables that Arm is obligated to provide under the ALA? ... A. It is a -- part of the purpose of the document is to summarize the deliverables that Arm will be providing, whether it's an architectural annex or even a standard product annex.”); Annex 1 to the Architecture License Agreement Between ARM Limited and NUVIA Inc., March 27, 2020, ARM_00057230–243 at ARM_00057235.

how the redacted provisions would affect Professor Subramanian's analysis of ARM's ALAs or other issues in his report.

83. A review of incomplete and redacted contracts, which do not contain information about the scope of licensed technology and fee and royalty structures, precludes Professor Subramanian from offering any reliable assessment as to the degree of individualization in ARM ALAs at large. In forming his opinion, Professor Subramanian does not purport to have reviewed other materials or have engaged in conversations with anyone at ARM or third parties about the negotiating history for all of ARM's active and non-active third-party ALAs.

84. Given these deficiencies, and the absence of any methodical analysis, Professor Subramanian's conclusions about both (i) the individualized nature of ARM's ALAs (including their negotiations) and (ii) whether ARM's approach to its negotiations of the NUVIA and Qualcomm ALAs were consistent with ARM's overall practices are unfounded and speculative. Moreover, as discussed in more detail below, nothing Professor Subramanian relies on indicates that ARM's goals did not overlap or that there were not similarities between the ALAs.

2. Professor Subramanian Ignores the Existence of Overlapping Rights Granted in ARM's ALAs, Including in the NUVIA and Qualcomm ALAs.

85. Professor Subramanian states that "Arm's ALAs [REDACTED]"

[REDACTED] ¹³⁵ Professor Subramanian additionally asserts that he specifically conducted an "analysis of the Qualcomm ALA alongside Nuvia's ALA," which [REDACTED]

[REDACTED] ¹³⁶ He also asserts that "each reflect[ed] the deliberate intentions and expectations of Qualcomm or Nuvia, respectively,"¹³⁷ and thus "the two contracts are . . . not interchangeable in terms of business intentions and

¹³⁵ Subramanian Report, ¶ 83.

¹³⁶ Subramanian Report, ¶ 56.

¹³⁷ Subramanian Report, ¶ 63.

applicability.”¹³⁸ These conclusions underlie Professor Subramanian’s statement that if “Qualcomm could buy Nuvia and simply ignore the [change-in-control] and termination provisions in the Nuvia ALA, that creates the situation in which Qualcomm (or other entities) would have the opportunity to have free use of the technology developed by other parties—such as Nuvia—simply by acquiring them. If a company can simply acquire a licensed entity and unilaterally change the terms of its own license, Arm’s entire licensing ecosystem would be threatened.”¹³⁹

86. Professor Subramanian’s conclusions about the individualized nature of ARM’s ALAs, generally, and the Qualcomm and NUVIA ALAs, specifically, are overly broad and unsupported. Accordingly, Professor Subramanian’s conclusion that Qualcomm’s acquisition of NUVIA would result in Qualcomm “unilaterally chang[ing] the terms of its own license,” to the detriment of ARM’s ecosystem is also unsupported.¹⁴⁰

87. As an initial matter, Professor Subramanian’s statements about ALAs generally are without support. ARM’s ALAs could very well cover identical technology. Accordingly, one licensee may have been delivered the same technology as another licensee and had the same rights to use that technology to design products. As noted above, the eight ALAs Professor Subramanian reviewed were redacted and did not contain the Annex 1 associated with each contract, so he has no basis to know what technology is covered by those agreements. Nor does he consider how such similarities would impact his analysis or his opinions about ARM’s “intentions and expectations.”¹⁴¹

88. More critically, however, Professor Subramanian fails to take into account the nature of the rights granted in the Qualcomm ALA, how they overlap with those granted in the NUVIA ALA, and how those overlapping rights reflect the “intentions and expectations” of ARM, the common counterparty. Specifically, Professor Subramanian does not consider that the Qualcomm

—[REDACTED]—and I understand that it granted even broader rights—as the Qualcomm ALA also

¹³⁸ Subramanian Report, ¶ 65.

¹³⁹ Subramanian Report, ¶ 85.

¹⁴⁰ *Id.*

¹⁴¹ Subramanian Report, ¶ 63.

[REDACTED] 142

89. Having failed to consider (or acknowledge) these overlapping rights, Professor Subramanian’s statements that the Qualcomm and NUVIA ALAs are not interchangeable, and that ARM had distinct “intentions and expectations” with regard to each contract is overly broad. While they are not identical agreements, Professor Subramanian fails to acknowledge that parts of the agreements, including certain of the licensed technology, are the same, and therefore that ARM’s intentions and expectations, which presumably include an intention to allow licensee use of the licensed technology, are, at least in part, the same in both agreements.

90. Accordingly, Professor Subramanian’s implication that Qualcomm simply “acquired” a licensed entity in order to obtain license rights from ARM is not supported. Instead, Qualcomm previously negotiated its own license and then, for other reasons,¹⁴³ acquired another licensed

¹⁴² See Section IV.B. Counsel has instructed me to assume that the scope of Qualcomm’s rights and obligations under its own ALA are the same or broader than that under the NUVIA ALA.

¹⁴³

[REDACTED] (“[REDACTED]”)

[REDACTED] :

entity. Because Qualcomm had its own ALA with ARM that covered the same—and additional—ARM intellectual property, Qualcomm did not need to acquire NUVIA for purposes of obtaining license rights from ARM.

91. Moreover, Professor Subramanian does not identify which terms Qualcomm purportedly “unilaterally changed” in its own ALA by acquiring NUVIA, nor does he explain how ARM’s “entire licensing ecosystem would be otherwise threatened” by Qualcomm’s acquisition of another licensed entity. Professor Subramanian does not analyze the externalities resulting from a but-for scenario where ARM would not have terminated the NUVIA ALA. Given that almost one year passed from the NUVIA acquisition and ARM’s termination of the NUVIA ALA, it seems unlikely at best that Qualcomm acquiring NUVIA and continuing to develop technology created under the NUVIA ALA would have led other licensees directly or indirectly to change their behavior with respect to ARM, as Professor Subramanian contends in his report. Indeed, ARM witnesses have testified that has not happened despite a year passing between the NUVIA acquisition and ARM’s termination of the NUVIA ALA.¹⁴⁴

92. As a matter of custom and practice, ARM could have restricted Qualcomm’s ability to develop technology obtained from acquiring other parties (such as NUVIA) in the Qualcomm

¹⁴⁴ Deposition of Rene Haas, December 12, 2023, pp. 165:24–166:5 (“Q. Okay. And sitting here today, what – what concrete harm has Arm suffered? A: What concrete harm – Q. Yes. A. – that we have suffered? Q. Yes. A. Nothing yet.”); Deposition of Will Abbey, October 27, 2023, pp. 365:23–367:17 (Q. Are any current Arm customers

... A. Not to my knowledge. Q.

Q. Has Arm lost any contracts as a result of Qualcomm’s acquisition of NUVIA? A. I - I wouldn’t know. Not to my knowledge. Q. Has Arm made less money on any of its license agreements as a result of Qualcomm’s acquisition of NUVIA? A. It’s hard to quantify that. So I don’t know for sure. Q. Has any partner told you -- anyone at Arm, to your knowledge, that it is planning to terminate its agreement with Arm as a result of Qualcomm’s acquisition of NUVIA? A. No. ... No Arm licensees told me that it’s looking to terminate its agreement as a consequence of the acquisition of NUVIA by Qualcomm.”); Deposition of Paul Williamson, November 9, 2023, p. 244:6–14 (“Q. Have any ARM licensees not complied with any of its license agreements with ARM as a result of Qualcomm’s action, as alleged in this litigation? A. So I am not yet aware of somebody using this as a reason to not comply. However, future damages of this are inestimable.”).

ALA, by including restrictions on a licensee’s ability to (i) buy other companies (such as NUVIA) or (ii) combine its own technology or institutional capabilities with the technology developed by its acquisition targets. But ARM did not do so. [REDACTED]

[REDACTED]

[REDACTED] Moreover, [REDACTED]

[REDACTED].¹⁴⁷ Indeed, by ignoring these rights—and the absence of restrictions on acquiring ARM-licensed entities—Professor Subramanian is effectively invalidating the benefits of Qualcomm’s agreement with ARM.¹⁴⁸

145 [REDACTED]

146 [REDACTED]

147 [REDACTED] *See also* Deposition of Simon Segars, November 16, 2023, pp. 217:17–218:18 (“Q. Okay. [REDACTED]

[REDACTED]

148 [REDACTED] pecifically, in [REDACTED]

[REDACTED]. *See* Amendment One Between ARM Limited and Ampere Computing LLC, June 7, 2021, ARM_01245720–726 at ARM_01245723–726; Architecture License Agreement (ALA) Between ARM Limited and Ampere Computing LLC, February 3, 2018, ARM_01246067–085 at ARM_01246081–082. In its Motion for a Protective Order in this case, Ampere described Exhibit A as a list that [REDACTED]” *See* Non-Party Ampere Computing LLC’s Section Motion for Protective Order to Maintain Redactions of Competitively Sensitive Commercial Information, *Arm Ltd. v. Qualcomm Inc., et al.*, United States District Court for the District of Delaware, Case No. 1:22-cv-01146, Doc. No. 240 at 6, January 8, 2024.

B. The Fact That Qualcomm Sought ARM's Consent to Assign NUVIA's License Agreements Does Not Reflect an Admission That Consent Was Required in Order to Develop NUVIA Technology.

93. Based on broad “norms in transactional practice,” Professor Subramanian concludes that “Qualcomm and Nuvia seemed to be aware of the [anti-assignment] provisions in the ALAs.”¹⁴⁹ In connection with that conclusion, Professor Subramanian assesses record evidence and claims that “Qualcomm’s initial communications show that it anticipated needing” ARM’s consent “in order to continue developing Nuvia’s innovations based on Arm’s IP.”¹⁵⁰

94. Professor Subramanian’s conclusion appears to consist of an opinion about legal issues, which I do not generally understand to be within the role of an expert, and I respond here only to the extent his conclusion is considered admissible. In any event, based on my review of the record, I do not find Qualcomm’s communications with ARM around the time of the NUVIA acquisition to be an acknowledgement by Qualcomm that assignment of the NUVIA ALA was necessary in order for Qualcomm to continue developing NUVIA technology.

95. In order to show that Qualcomm was required to obtain consent based solely on the fact that Qualcomm sought consent for the assignment of the NUVIA ALA to Qualcomm, Professor Subramanian would have to rule out the possibility that (as was often true in my experience negotiating and executing M&A transactions while in practice) parties may seek consent for a number of other reasons, including, for example, to manage the potential risk of tensions with a counterparty that has or might assert rights under contracts that do not include provisions addressing all possible contingencies, to convey efforts to cooperate, to update and reset overall terms governing an ongoing commercial relationship, or to expand, contract, or right-size terms and conditions for both parties.¹⁵¹

96. Economic theory gives reasons for contract parties to care about whether their counterparts

¹⁴⁹ Subramanian Report, ¶ 19(2).

¹⁵⁰ Subramanian Report, ¶ 75.

¹⁵¹ Based on the record evidence in this litigation, regardless of the proper interpretation of the contracts here, ARM would and did assert positions and claims that its consent was required for Qualcomm to pursue any technological development following the NUVIA acquisition. While Qualcomm disagreed with ARM’s position, “in an effort to compromise, on February 25, 2021, Qualcomm asked that ARM consent to the transfer of the NUVIA licenses to Qualcomm by March 2, 2021.” Defendants’ Answer and Defenses to Plaintiff’s Complaint, ¶ 203. *See also* Letter from Ziad Asghar (Qualcomm) to Paul Williamson (ARM), February 25, 2021, ARM_01215478–479 at ARM_01215479.

perceive them to be acting not simply in accordance with their strict legal rights, but in the spirit of cooperation and with a view to producing ongoing benefits to both parties.¹⁵² As a result, parties often make offers in negotiations in an effort to adjust relationships in settings where relations are significantly altered, such as in a major M&A transaction. It does not mean that such offers reflect the offeror's view of a legally required resolution of the dispute. Indeed, the basic negotiation-theoretic concept of "best alternative to a negotiated agreement" ("BATNA") presumes the possibility of a negotiation failure,¹⁵³ as bargaining breakdowns are common in practice, and academics have developed a number of theories to explain how breakdowns can occur, even when the parties might rationally find a negotiated agreement to be in their mutual interests.¹⁵⁴

C. Professor Subramanian's Analysis of "Change in Control" Provisions Is Disconnected from the Facts of This Case and Blurs Customary Differences among Such Provisions.

97. Throughout his report, Professor Subramanian refers to Section [REDACTED] of the NUVIA ALA as a [REDACTED] and based on that characterization, goes on to describe at length the theory and utility of change-in-control provisions, which ultimately form the basis of Professor Subramanian's opinion that [REDACTED]

¹⁵² Oliver Hart and John Moore, "Contracts as Reference Points," *Quarterly Journal of Economics* 123, no. 1, 2008, pp. 1–48 at p. 3.

¹⁵³ Ian Ayres and Barry Nalebuff, "Common Knowledge as a Barrier to Negotiation," *UCLA Law Review* 44, 1997, pp. 1631–1660 ("In a distributive negotiation, it can be both individually and jointly useful for one party to explain why the other side's best alternative to negotiated agreement (BATNA) is lower than she thinks ... A negotiator wants her adversary to have a weak BATNA. More than that, she wants her adversary to believe that she has a weak BATNA, because, ultimately, her adversary's perceptions will determine her willingness to agree").

¹⁵⁴ See, e.g., Vincent P. Crawford, "A Theory of Disagreement in Bargaining," *Econometrica* 50, no. 3, 1982, pp. 607–637 at pp. 607–608 ("It is demonstrated that in spite of this avoidable inefficiency, when successful commitment is uncertain and irreversible it can still be rational for individuals to attempt commitment and thereby risk an [bargaining] impasse ... [P]lainly, any theory of bargaining that assumes away the possibility of disagreement must fail to capture an aspect of bargaining that is of central importance in the design problem mentioned above."); Roger B. Myerson and Mark A. Satterthwaite, "Efficient Mechanisms for Bilateral Trading," *Journal of Economic Theory* 29, 1983, pp. 265–281 at p. 266 ("In Section 3, we show it is generally impossible to have a mechanism that is incentive-compatible, individually-rational, and ex post efficient ... In Section 4, we show how to construct mechanisms which maximize the expected total gains from trade, subject to the constraints of individual rationality and incentive compatibility."); Ian Ayres and Barry Nalebuff, "Common Knowledge as a Barrier to Negotiation," *UCLA Law Review* 44, 1997, pp. 1631–1660; Alice J. Lee and Daniel Ames, "'I can't pay more' versus 'It's not worth more': Divergent Effects of Constraint and Disparagement Rationales in Negotiations," *Organizational Behavior and Human Decision Processes* 141, 2017, pp. 16–28.

¹⁵⁵ Subramanian Report, ¶ 27.

It appears that Professor Subramanian's interpretations of Section [REDACTED] on legal issues that would supplant the role of the courts as the interpreters of contract provisions, rather than expertise in negotiation theory or transactional practice.

98. Professor Subramanian's analysis is also irrelevant and potentially confusing because Section [REDACTED] of the NUVIA ALA is more aptly characterized as [REDACTED].¹⁵⁷ Professor Subramanian's attempt to [REDACTED] is inconsistent with my experience and study of M&A and contract custom and practice.

99. In my experience, a general [REDACTED] Professor Subramanian does not

¹⁵⁶ Subramanian Report, ¶ 78.

¹⁵⁷ Language referring or specifying changes of control can be found in a wide variety of contracts and can have a wide variety of practical and economic effects. Customary change of control clauses that are intended not simply to function to prevent assignment of a specific contract but to provide veto rights over changes of control (with the related right to seek an injunction over a change of control if the veto rights are not respected), or which link specific financial or legal entitlements to changes of control, are common in contracts governing ownership or control of privately held companies, and can be found at some public companies. Such clauses provide explicit consent rights, and do not rely on anti-assignment language with transactional triggers. *See, e.g.*, "Amended and Restated Stockholders Agreement By and Among Savers Value Village, Inc., Ares Corporate Opportunities Fund V, L.P., ASSF IV AIV B, L.P., ASOF Holdings I, L.P., Amari Investment PTE. Ltd. and ASSF IV AIV B Holdings III, L.P.," 2023, available at <https://www.sec.gov/Archives/edgar/data/1883313/000119312523142205/d264743dex41.htm> (Last visited on February 23, 2024); "Stockholders Agreement By and Among The Azek Company Inc., Ares Corporate Opportunities Fund IV, L.P., and Ontario Teachers' Pension Plan Board," 2020, available at <https://www.sec.gov/Archives/edgar/data/1782754/000119312520028208/d776367dex42.htm> (Last visited on February 23, 2024). Alternatively, they provide affirmative rights (such as the right to "put" shares for specified payments) linked to changes of control. *See, e.g.*, "Put Agreement entered into by and between Ermenegildo Zegna Holditalia S.p.A. and Thom Browne," August 25, 2018, available at <https://www.sec.gov/Archives/edgar/data/1877787/000119312521259464/d198909dex1011.htm> (Last visited on February 23, 2024); "Co-Investment Agreement by and among Chart Industries, Inc., ISQ HTEC HoldCo Limited, and ISQ Blueprint Acquisitions Inc.," September 7, 2021, available at <https://www.sec.gov/Archives/edgar/data/892553/000089255321000133/gt1s-20210930x10qexx101.htm> (Last visited on February 23, 2024). Alternatively, they provide one party the affirmative right to participate in a change of control transaction, through "drag-along" or other rights. *See, e.g.*, "Shareholder Agreement among Signing Day Sports, Inc. and each of the stockholders of Signing Day Sports, Inc.," May 17, 2022, available at https://www.sec.gov/Archives/edgar/data/1898474/000121390023053645/ea181047ex10-1_signing.htm (Last visited on February 23, 2024).

acknowledge fundamental differences among such provisions, which further undermines his opinion regarding [REDACTED], which appears to be premised on his analysis of [REDACTED], which is not in fact applicable to Section [REDACTED] of the NUVIA ALA. Moreover, Professor Subramanian's mistaken identification of [REDACTED] effectively appears to suggest that ARM was entitled to prohibit Qualcomm's acquisition of NUVIA. The remainder of this section describes the differences among c [REDACTED] in more detail and the impact these differences have on Professor Subramanian's analysis.

1. [REDACTED]s Serve Different Goals and Have Different Economic Effects.

100. Customarily, in my experience, "[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

101. Anti-assignment clauses, by contrast, [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

¹⁵⁸ Elaine D. Ziff and John G. Deming, "IP Licenses: Restrictions on Assignment and Change of Control," *Practical Law Company*, 2012, p. 10; Kenneth Ayotte and Henry Hansmann, "Legal Entities as Transferable Bundles of Contracts," *Michigan Law Review* 111, 2013, pp. 715–758 at p. 724.

[REDACTED]

102. This crucial difference means that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

103. No experienced M&A professional would treat an [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

104. Despite these customary differences, Professor Subramanian's report implicitly assumes that a [REDACTED]

[REDACTED]

[REDACTED] Throughout his report, Professor Subramanian uses this false equivalence to draw mistaken conclusions about the NUVIA ALA.¹⁶⁰

105. The assumed or apparent equivalence, however, is not in accordance with custom and practice, [REDACTED]

[REDACTED] As Professors Ayotte and Hansmann explain in the *Michigan Law Review*, "If the

¹⁵⁹ *Id. See supra* ¶ 148.

¹⁶⁰ Subramanian Report, ¶ 27 [REDACTED]

[REDACTED]

counterparty to a contract with a corporation wishes to limit the persons to whom ownership or control of the corporation can be sold, it must do this through specific language to that effect in the contract [REDACTED]¹⁶¹ While a customary [REDACTED] Professors Ayotte and Hansmann note explicitly that [REDACTED]

106. Transactional practitioners customarily take the same view. In fact, leading practitioners have identified the conflation of these two provisions (as Professor Subramanian does in his report) as “[a] common misconception in drafting and interpreting contracts, including IP licenses”—that is, [REDACTED] Instead, practitioners attribute such rights to a [REDACTED] which gives a party [REDACTED]¹⁶⁴ Thus, practitioners recommend that [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED].

2. Section [REDACTED] the NUVIA ALA Is an [REDACTED]

107. Section [REDACTED] of the NUVIA ALA states:

[REDACTED]

¹⁶¹ Kenneth Ayotte and Henry Hansmann, “Legal Entities as Transferable Bundles of Contracts,” *Michigan Law Review* 111, 2013, pp. 715–758 at p. 724.

¹⁶² *Id.*

¹⁶³ Elaine D. Ziff and John G. Deming, “IP Licenses: Restrictions on Assignment and Change of Control,” *Practical Law Company*, 2012, p. 10.

¹⁶⁴ *Id.*

¹⁶⁵ Elaine D. Ziff and John G. Deming, “IP Licenses: Restrictions on Assignment and Change of Control,” *Practical Law Company*, 2012, p. 13.

108. Documents and deposition testimony reflect that ARM drew a distinction between these customary types of contractual provisions, that Section [REDACTED] of the NUVIA ALA was discussed as [REDACTED]

[REDACTED] For instance, Simon Segars, the former CEO of ARM, testified:

109. Paul Williamson, a Rule 30(b)(6) witness for ARM, similarly testified that he did not [REDACTED] of NUVIA by Qualcomm.¹⁶⁸ Documents produced by ARM similarly reflect that—underlying ARM executives’ awareness of the difference between these contractual provisions—with different counterparties, ARM discussed [REDACTED].¹⁶⁹

3. Professor Subramanian’s Conflation of the Two Provisions Renders His Analysis Unreliable and Inapplicable.

110. Despite evidence and practice establishing the difference between [REDACTED] in his report, Professor Subramanian does not make these distinctions clear. Accordingly, much of Professor Subramanian’s analysis concerning change-[REDACTED] (including why contracts contain some form of such a provision) is not applicable to [REDACTED]

¹⁶⁶ [REDACTED] 9197.

¹⁶⁷ Deposition of Simon Segars, November 16, 2023, p. 143:5–19. *See also* Deposition of Simon Segars, November 16, 2023, Exhibit QX110, ARM_00081374 (“There is nothing to stop [Qualcomm] closing without an assigned contract from [ARM] – partners do this all the time and we can’t stop them.”).

¹⁶⁸ Deposition of Paul Williamson, November 9, 2023, pp. 7:19–25, 186:5–11.

¹⁶⁹ Deposition of Richard Grisenthwaite, November 15, 2023, pp. 194:24–195:9 (“Q. [REDACTED]”). *See also* Deposition of Richard Grisenthwaite, November 15, 2023, Exhibit QX090, ARM_00081203–208 at ARM_00081208.

Section [REDACTED] of the NUVIA ALA. For example, Professor Subramanian states that [REDACTED]

[REDACTED] would:

i. [REDACTED]

171

111. None of these situations apply here.

112. *First*, I am not aware of any facts that would support the notion that there has been any change, let alone a dramatic change, in the scope of rights and obligations as between ARM and Qualcomm, and Professor Subramanian points to no such facts. While Professor Subramanian appears to imply that Qualcomm’s acquisition of NUVIA would change the “expected work scope” ARM and Qualcomm had “in mind,”¹⁷² Professor Subramanian does not conduct any assessment or provide any opinion on the “expected work scope” of either the NUVIA or Qualcomm ALA beyond pointing out difference in the agreements, or on how ARM sought to protect either vis-à-vis the assignment negotiations between ARM and Qualcomm.¹⁷³

113. Based on my review of the record, my understanding is that [REDACTED]

¹⁷⁰ Subramanian Report, ¶ 42.

¹⁷¹ Subramanian Report, ¶ 45.

¹⁷² Subramanian Report, ¶ 65.

¹⁷³ While Professor Subramanian points to six [REDACTED]

[REDACTED] See Subramanian Report, ¶ 65, Table 1. Moreover, Subramanian does not assert that Qualcomm has, at any point, attempted to expand the [REDACTED]

¹⁷⁴ See, e.g., Deposition of Richard Grisenthwaite, November 15, 2023, p. 63:2–11 (“Q. And when you were considering -- I understand your role was -- you testified your role was somewhat limited, but you were involved in some way. [REDACTED]

[REDACTED] Deposition of Simon Segars, November 16, 2023, pp. 121:13–122:6; Deposition of Rene Haas, December 12, 2023, pp. 96:10–97:18.

114. In contrast, based on my review of the record, the “expected work scope” of the Qualcomm [REDACTED].¹⁷⁵ Indeed, I understand that Qualcomm had already produced custom CPUs for the mobile market under its ALA in the past.¹⁷⁶ During the parties’ negotiations concerning assignment, Qualcomm, as a compromise, [REDACTED]

[REDACTED]¹⁷⁷ Professor Subramanian’s failure to consider the fact that, under the standard negotiation theory he applies, Qualcomm was entitled—and would customarily be expected—to protect its own “expected work scope” under its own ALA, undermines his assessment.

115. Moreover, Professor Subramanian’s attempt to turn NUVIA’s “start-up status” into a limit on Qualcomm’s rights also ignores an important outcome common to many technology start-ups: successful ones can be—indeed, customarily are—acquired by larger strategic partners.¹⁷⁸ Documents reflect that ARM executives were aware of this possibility when the parties negotiated NUVIA’s ALA, including its “expected work scope.” For example, Mr. Segars previously wrote

¹⁷⁵ See, e.g., Deposition of Paul Williamson, November 9, 2023, pp. 38:25–39:24 (testifying that “Qualcomm has operations that are much broader than the markets in which we had been working with – in anticipation on with Nuvia at the time.”).

¹⁷⁶ [REDACTED]; Deposition of Richard Grisenthwaite, November 15, 2023, pp. 218:21–219:5 (“Q. Are you aware of Qualcomm’s prior custom cores under the ALA? A. Yes. Q. And some of those were commercialized, correct? ... A. Were commercialized, yes.”).

¹⁷⁷ [REDACTED] Email chain from Will Abbey (ARM) to Paul Williamson (ARM), [REDACTED] August 19, 2021, ARM_00045219–222 at ARM_00045219–221.

¹⁷⁸ See, e.g., Manju Puri and Rebecca Zarutskie, “On the Life Cycle Dynamics of Venture-Capital- and Non-Venture-Capital-Financed Firms,” *Journal of Finance* 67, no. 6, 2012, pp. 2247–2293 at p. 2268 (showing that by 2005, vastly more venture-capital backed start-ups were being acquired by strategic acquirers in M&A deals than were going through initial public offerings).

that he “always felt like an acquisition [of NUVIA] was inevitable.”¹⁷⁹

116. Professor Subramanian’s analysis fails to recognize that ARM agreed to contracts with NUVIA that did not include a [REDACTED], giving ARM no veto of such an acquisition, despite executives’ awareness that acquisition was a distinct possibility. ARM executives—knowledgeable about the industry they were and are in—were no doubt aware that potential strategic acquirers of NUVIA could potentially have their own ALA or TLA with ARM,¹⁸⁰ and even that Qualcomm could be (as it was) one of those potential acquirers. Likewise,

117. *Second*, as noted above in Section V.A, Qualcomm’s existing ALA with ARM meant that Qualcomm did not need to “gain access to licensed technology by acquiring” NUVIA.¹⁸¹ For example, Qualcomm did not point to the NUVIA ALA as giving Qualcomm access to licensed technology, nor does Professor Subramanian point to any evidence that Qualcomm did so. Accordingly, Professor Subramanian’s various statements concerning [REDACTED] are inapplicable here both because the NUVIA ALA [REDACTED], and because there was no such concern here where Qualcomm had its own ALA in place.

118. ARM’s conduct is consistent with as much: ARM waited a year after Qualcomm’s

¹⁷⁹ Deposition of Simon Segars, November 16, 2023, Exhibit QX103, ARM_00062124 (“Congratulations on the [NUVIA] deal ... It always felt like an acquisition was inevitable as the total cost to get to market would be so large.”). *See also id.*, p 78:5–19 (“[C]reating a CPU core, demonstrating its performance, to me, felt that that was a stepping stone for an acquisition. Q. Okay. And you really never expected [NUVIA] to succeed this way on its own? A. I think the probability of that would have been quite low.”).

¹⁸⁰ *See, e.g.*, Deposition of Simon Segars, November 16, 2023, p. 55:20–23 [REDACTED]

¹⁸¹ Counsel has instructed me to assume that [REDACTED]

. *See also* [REDACTED]

? A. [REDACTED]

¹⁸² Subramanian Report, ¶ 47.

acquisition of NUVIA to terminate the NUVIA license agreements.¹⁸³ Professor Subramanian fails to discuss the fact that, during this time, ARM knew Qualcomm was working to get a product(s) to the market and incorporating NUVIA's technology into its own.¹⁸⁴ Professor Subramanian also fails to discuss record evidence indicating that ARM, not Qualcomm, [REDACTED] [REDACTED] For example, documentary evidence indicates that ARM's approach [REDACTED]

[REDACTED]⁸⁶ To the extent that ARM was concerned about improper usage of its technology as Professor Subramanian posits, I would have expected ARM to seek to protect its rights more promptly.

119. *Third*, Qualcomm's acquisition of NUVIA did not force ARM to do business with Qualcomm against its will or on terms that ARM had not agreed to. ARM agreed to the terms of the Qualcomm ALA. Under the Qualcomm ALA, [REDACTED] [REDACTED].¹⁸⁷ In fact, the record indicates that Qualcomm

¹⁸³ See Section IV.D.

184 Letter from Ziad Asghar (Qualcomm) to Paul Williamson (ARM), January 27, 2021, ARM_00063625 [REDACTED]
[REDACTED]
[REDACTED] Email chain from
Rene Haas (ARM) to Simon Segars (ARM) and Cristiano Amon (Qualcomm), [REDACTED] May 5,
2021, ARM_00025394–397 at ARM_00025396 [REDACTED]
[REDACTED] ”); Email chain from Rene Haas (ARM) to Simon Segars (ARM)
and Cristiano Amon (Qualcomm), [REDACTED] ” May 5, 2021, ARM_00025394–397 at ARM_00025396
[REDACTED]
[REDACTED] ; Deposition of Simon Segars, November 16,
2023, pp. 151:12–152:3

¹⁸⁵ Deposition of Simon Segars, November 16, 2023, Exhibit QX110, ARM_00081374 (“I have a call with [Qualcomm CEO] Cristiano [Amon] tomorrow, and to be fair to them they wanted the call sooner, we slow-rolled”). *See also* Deposition of Simon Segars, November 16, 2023, pp. 140:2–141:10.

¹⁸⁶ Internal exchange between Andrew Howard (ARM) and Paul Williamson (ARM), May 27, 2021, ARM 00115764.

¹⁸⁷ Master Royalty Schedule Between Qualcomm Global Trading PTE, LTD. and ARM Limited, May 30, 2013, ARM_01298891-929; Annex 1 to the Amended and Restated Architecture License Agreement Between ARM Limited and Qualcomm Global Trading, PTE, LTD, May 30, 2013, QCARM_0343120-142 at QCARM_0343139; v8 Next Architecture Annex to the Amended and Restated Architecture License Agreement Between ARM Limited and Qualcomm Global Trading, PTE, LTD, May 30, 2013, QCARM_0338573-576 at QCARM_0338576.

ultimately became ARM's largest customer¹⁸⁸—a fact that is hard to reconcile with Professor Subramanian's argument that, after a change in control, a licensor may be forced to do business with a third party "against its will."¹⁸⁹

120. In sum, Professor Subramanian [REDACTED]

[REDACTED]

[REDACTED] Equating the two provisions, as Professor Subramanian has done, [REDACTED]

[REDACTED]

[REDACTED] Professor Subramanian's failure to distinguish between [REDACTED]

[REDACTED]

[REDACTED] I discuss below, Professor Subramanian attempts to pave a way for ARM to effectively invalidate the acquisition by characterizing Section [REDACTED] of the NUVIA ALA as having given [REDACTED]

[REDACTED]

D. Professor Subramanian Concludes That NUVIA's ALA Requires Qualcomm to Discontinue the Use of the Technology Acquired from NUVIA without Providing Any Support for Such Conclusion.

121. Based on Professor Subramanian's [REDACTED]

[REDACTED] Professor Subramanian further concludes that [REDACTED]

¹⁸⁸ Deposition of Rene Haas, December 12, 2023, p. 107:12–17 (“Q. And Qualcomm is Arm’s largest customer; correct? A. At the moment. Q. How about in 2021 and 2022? Was Qualcomm Arm’s largest customer at that time? A. 2021, maybe. 2022, probably.”).

¹⁸⁹ Subramanian Report, ¶ 41.

¹⁹⁰ Subramanian Report, ¶ 27.

¹⁹¹ Subramanian Report, ¶ 57.

¹⁹² Subramanian Report, ¶¶ 45, 57.

122. As discussed above, it appears that Professor Subramanian’s conclusion consists of a legal opinion that is not derived from expertise in negotiation theory or transactional practice. Further, the NUVIA ALA [REDACTED] that needs to be effectuated here. But even if it did, Professor Subramanian cites no support for his assertion that the [REDACTED]

[REDACTED]”¹⁹⁴ While I do not offer any opinion [REDACTED]

[REDACTED] Section [REDACTED] of the NUVIA ALA, I note that Professor Subramanian does not offer any explanation as to how he reached the conclusion that [REDACTED]

123. Professor Subramanian’s failure to support this assumption is telling, because it is inconsistent with both the text and negotiation history of the NUVIA ALA and ARM’s public statements regarding the nature of its ALA licenses. Collectively, these documents and statements suggest instead that [REDACTED]

[REDACTED] forth in Section [REDACTED] of the NUVIA ALA. Professor Subramanian offers no explanation as to why he ignored evidence that runs counter to his assumption, which alone renders his opinions speculative and unreliable. Professor Subramanian’s follow-on discussion of “real-world” case studies¹⁹⁶—which he purports to cite in support of the broader proposition that it is common business practice for a counterparty to be required to cease use of or destroy IP after an agreement is terminated¹⁹⁷—is similarly flawed, as these case studies are on their face incomparable to the current litigation, and in any event do not

¹⁹³ Subramanian Report, ¶ 78.

¹⁹⁴ Subramanian Report, ¶ 78.

¹⁹⁵ Subramanian Report, ¶¶ 61, 71.

¹⁹⁶ Subramanian Report, ¶¶ 79–82.

¹⁹⁷ Subramanian Report, ¶¶ 78–79.

contain sufficient detail or information to permit a straightforward comparison to the instant dispute. The remainder of this section describes each of these issues and their impact on Professor Subramanian's opinion in more detail.

1. Professor Subramanian's Conclusion Is Inconsistent with the Negotiation of the Relevant Provision in the NUVIA ALA.

124. Throughout his report, Professor Subramanian states—without citing any support—that the NUVIA ALA “ [REDACTED]

[REDACTED]⁸ As an initial matter, in order to understand the terms of a particular contract, the specific contractual language must be considered. Professor Subramanian appears to agree with that basic premise—as he opines that “ [REDACTED]

[REDACTED]⁹—but he nonetheless appears to disregard the specific language used in Section [REDACTED] of the NUVIA ALA in [REDACTED]

125. Section [REDACTED] of the NUVIA ALA states that [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

126. Notably, while Professor Subramanian acknowledges that [REDACTED]
[REDACTED]
[REDACTED] is referenced in Section [REDACTED] Professor Subramanian fails to consider the

¹⁹⁸ Subramanian Report, ¶ 78. *See also id.* ¶ 57 ([REDACTED])

¹⁹⁹ Subramanian Report, ¶ 53.

²⁰⁰ Section [REDACTED] of NUVIA ALA, ARM_00059183–199 at ARM_00059196.

²⁰¹ *Id.*

²⁰² Subramanian Report, ¶ 28.

²⁰³ Section [REDACTED] and Definitions [REDACTED] of NUVIA ALA, ARM_00059183–199 at ARM_00059183, ARM_00059185, ARM_00059196–197.

potential impact of his assumptions vis-à-vis contract termination.

127. In the NUVIA ALA, NUVIA Technology is defined as [REDACTED]

[REDACTED] Gerard Williams testified that:

[REDACTED]

While I do not offer an interpretation of the NUVIA ALA as a matter of law, the evidence that NUVIA sought to protect its own technology and memorialized this in the contract by insisting on adding the definition [REDACTED] to the ALA is inconsistent with Professor Subramanian's unsupported assumption that [REDACTED]

[REDACTED]

128. What would not have made business sense for NUVIA was to agree, as Professor Subramanian suggests, [REDACTED]

[REDACTED]. In my experience, start-ups such as NUVIA are customarily quite aware of the importance of preserving their value through future change-of-control transactions, and it would have been contrary to customary M&A-planning practices for NUVIA to enter into a license agreement with ARM that [REDACTED]

[REDACTED]

129. Even assuming that one or both parties considered the possibility of [REDACTED], and accepting Professor Subramanian's premise that there were "[REDACTED]"

204 [REDACTED] of NUVIA ALA, ARM_00059183–199 at ARM_00059185.

205 [REDACTED]

206 [REDACTED]

such an extreme requirement would be customarily detailed in the agreement, which it is not.

2. Professor Subramanian's Conclusion Is Inconsistent with ARM's Statements Regarding Technology Developed under Its ALAs.

130. Professor Subramanian's conclusion that the NUVIA ALA [REDACTED] [REDACTED] implies that ARM has [REDACTED]. That implication, however, is inconsistent with how ARM has characterized technology developed under its ALAs in various submissions to regulators.

131. For example, in ARM's December 20, 2021 submission to the U.K. Competition and Markets Authority in connection with NVIDIA's attempted acquisition of ARM, ARM stated that its ALA licensees "do *not* use Arm's CPU designs" but instead "create their *own* proprietary CPU designs using their *own* engineering teams."²⁰⁹ Similarly, in a July 26, 2021 letter to the Department for Digital, Culture, Media and Sport in the U.K., Simon Segars—ARM's CEO at the time—wrote that ARM's ALA licensees "use their own in-house designs."²¹⁰

132. Professor Subramanian fails to establish why NUVIA, even after the termination of NUVIA's ALA, would be required to cease using or even destroy what ARM has referred to as [REDACTED]

²⁰⁷ Subramanian Report, ¶ 55.

²⁰⁸ Subramanian Report, ¶ 78.

²⁰⁹ "Anticipated Acquisition by Nvidia Corporation of ARM Limited: Initial Submission," December 20, 2021, available at https://assets.publishing.service.gov.uk/media/61d81a458fa8f505953f4ed7/NVIDIA-Arm_-_CMA_Initial_Submission_-_NCV_for_publication__Revised_23_December_2021_.pdf, p. 6 (Last visited on February 23, 2024) (emphasis in original). This public statement from ARM is mentioned in the Defendants' Answer and Defenses to Plaintiff's Complaint (at ¶ 40) that Professor Subramanian includes among his Materials Considered. Subramanian Report, Appendix B.

²¹⁰ Letter from Simon Segars (ARM) to Rhys Bowen (Department for Digital, Culture, Media, and Sport), July 26, 2021, ARM_00097016-018 at ARM_00097016-017.

3. Professor Subramanian's Conclusion Is Not Supported by the Cited Case Studies.

133. While he considers no evidence specific to this matter, Professor Subramanian more broadly asserts that [REDACTED]

[REDACTED] As an initial matter, while I have no opinion regarding the level and dollar amount of support that ARM purportedly provides in connection with its ALAs, I note that Professor Subramanian does not cite any support for his assumption that [REDACTED]

134. With respect to Qualcomm and NUVIA's ALAs, the agreements called for [REDACTED]
[REDACTED]
[REDACTED].²¹⁴ In fact, the

²¹¹ Subramanian Report, ¶ 78.

²¹² Subramanian Report, ¶ 78.

²¹³ Subramanian Report, ¶ 25 (stating that [REDACTED]).

²¹⁴ Sections [REDACTED] of Qualcomm ALA, ARM_00044650–692 at ARM_00044662, ARM_00044664 [REDACTED]

[REDACTED] "ANNEX 1, NUVIA, ARMV8-A ARCHITECTURE," September 27, 2019, QCARM_3839896–911 at QCARM_3839906–907.

[REDACTED] t. See Annex 1 to the Amended and Restated Architecture License Agreement Between ARM Limited and Qualcomm Global Trading, PTE, LTD, May 31, 2013, QCARM_0343120–142 at QCARM_0343139; v8 Next Architecture Annex to the Amended and Restated Architecture License Agreement Between ARM Limited and Qualcomm Global Trading, PTE, LTD, May 31, 2013, QCARM_0338573–576 at QCARM_0338576; Qualcomm ALA, ARM_00044650–692 at ARM_00044675.

NUVIA ALA explicitly says [REDACTED].²¹⁵ Similarly, testimony of Messrs. Segars and Williamson cited by Professor Subramanian as evidence of ARM's [REDACTED]

[REDACTED]⁶ I have not seen any ARM documents or testimony stating that ARM's support obligations [REDACTED]

135. Based in part on that unsupported assumption, Professor Subramanian references several “[r]eal-world cases” that purportedly support his bottom-line conclusion that ARM “must have confidence the benefits [NUVIA] received from [ARM’s] investments will be discontinued by [NUVIA] in the event of a change in control.”²¹⁸ While I have no opinion as to their applicability as a matter of law, the case studies Professor Subramanian cites are on their face inapplicable to the current dispute as a matter of basic economics. They do not provide any link between negotiation theory (which by definition abstracts from specifics and encompasses a range of possible as-applied implications) and the facts of this dispute, particularly as to the assertion that NUVIA was required to discontinue use or destroy its own proprietary technology after the termination of the NUVIA ALA.

²¹⁵ Section 7.2 of NUVIA ALA, ARM_00059183–199 at ARM_00059193.

²¹⁶ Deposition of Simon Segars, November 16, 2023, pp. 42:24–44:10 (“[REDACTED]

Deposition of Paul Williamson, November 9, 2023, p. 22:3–9

²¹⁷ “Anticipated Acquisition by Nvidia Corporation of ARM Limited: Initial Submission,” December 20, 2021, available at https://assets.publishing.service.gov.uk/media/61d81a458fa8f505953f4ed7/NVIDIA-Arm_-_CMA_Initial_Submission_-_NCV_for_publication__Revised_23_December_2021_.pdf, p. 6 (Last visited on February 23, 2024) (emphasis in original).

²¹⁸ Subramanian Report, ¶¶ 78–79.

136. In the first of Professor Subramanian’s cited case studies, Disney elected not to renew its partnership with Netflix and, as a result, Disney content was removed from Netflix.²¹⁹ Professor Subramanian does not discuss whether Netflix spent 18 months creating proprietary content and then was sold to a different company already licensed by Disney, or show that there was any relevant change in control for either the licensor or licensee that would make the case study more comparable to the current dispute. Nor is there any reason to believe that—analogously to this dispute—Netflix had a separate ongoing license agreement with Disney that would have provided it with rights despite the termination of its partnership by Disney.

137. The second case study relates to a change in control where D&N licensed software from Oracle, and after Sybase—an Oracle competitor—acquired D&N, Oracle withdrew from the licensing agreement with D&N due to the “transfer of rights.”²²⁰ The case study does not provide any reason to think that Sybase had its own separate license from Oracle at the time of its acquisition of D&N (as Qualcomm had with ARM before the NUVIA acquisition). Nor does the case study provide any detail as to the terms of the underlying license D&N had, which would be necessary to review in order to permit comparison to this dispute. Nor is there anything in the case study to suggest that Oracle sought to veto Sybase’s acquisition of D&N by pointing to a strong-form change-of-control clause, or to force D&N to destroy or give to Oracle derivative technology of any kind, much less technology that was defined in the D&N license to be proprietary technology of D&N’s. Professor Subramanian opines that this case study shows how “a company should not be forced, in effect, to license its intellectual property to a competitor.”²²¹ Even assuming Qualcomm is a competitor to ARM—which ARM’s own CEO denied in his deposition²²²—this situation is not comparable to the current dispute where ARM had voluntarily licensed Qualcomm and received years of licensing fees before the NUVIA acquisition. For these reasons, this case study, too, provides no support for Professor Subramanian’s conclusions.

138. Professor Subramanian cites two more case studies that purportedly illustrate that “it is reasonable and standard that terminations occur *even if* one party will lose the benefit of its

²¹⁹ Subramanian Report, ¶ 79.

²²⁰ Subramanian Report, ¶ 80.

²²¹ Subramanian Report, ¶ 80, quoting his own HBS case study.

²²² Deposition of Rene Haas, December 12, 2023, pp. 22:11–13, 54:6–8.

investments or improvements.”²²³ While Professor Subramanian’s report does not clearly outline how this contention is relevant to his assumption that NUVIA technology must be discontinued or destroyed after the change in control, I observe that neither the Starbucks/Kraft Foods nor the Hewlett-Packard/Beats Electronics case study describes a comparable situation to the current dispute where (i) one licensee acquires another licensee, and (ii) the licensor requires the discontinuance of use or destruction of the acquired company’s *own* technology. Instead, those case studies deal with situations where a partnership between two companies ends, and the non-terminating party must cease selling the terminating party’s products. In those situations, Professor Subramanian merely points out that certain investments the non-terminating party may have made during the partnership—such as marketing expenses to promote the terminating party’s products—were no longer beneficial. These fact patterns, as well as those listed in footnote 118 of the Subramanian Report, are not comparable here and Professor Subramanian does not cite any adequate basis for comparing these fact patterns with those at issue here.

E. Professor Subramanian Does Not Provide Any Basis for Concluding That Damages Would Be “Virtually Impossible to Quantify.”

139. Professor Subramanian does not provide any reliable economic, financial, methodological or other basis for concluding that damages would be “virtually impossible to quantify.”²²⁴ To support his conclusion, Professor Subramanian relies on anodyne aphorisms such as “predicting the result of a multi-issue negotiation is even more difficult” than single-issue negotiations and that any analysis of a hypothetical negotiation between ARM and Qualcomm over the NUVIA ALA “would need to factor in many considerations.”²²⁵ These assertions are insufficient as an explanation for why, in Professor Subramanian’s expert opinion, any calculation of damages would be “virtually impossible.”

140. As an initial matter, the inability of negotiation theory to “predict with great precision the outcome of a hypothetical successful negotiation between Qualcomm and [ARM] over a transfer of Nuvia’s ALA[] to Qualcomm”²²⁶ does not preclude one’s ability to quantify the “effects” that

²²³ Subramanian Report, ¶¶ 81–82 (emphasis in original).

²²⁴ Subramanian Report, ¶ 101.

²²⁵ Subramanian Report, ¶ 91.

²²⁶ Subramanian Report, ¶ 19(4).

Professor Subramanian claims “represent real economic damages to Arm.”²²⁷ While negotiation theory can be helpful in understanding and assessing aspects of practice, and even in guiding negotiators to better outcomes than without it, it is (almost by definition) general and abstract, and is rarely used to predict “with great precision” *anything* in the real world. Yet businesses are nonetheless routinely capable of being valued quantitatively without requiring that one identify a specific value “with great precision.” Consider the standard and well-accepted “discounted cash flow” valuation technique of projecting future cash flows and discounting those cash flows to present value using an estimated cost of capital. No finance or valuation expert would ever claim that the “cost of capital” over some number of years into the future can be estimated “with great precision.”²²⁸ Yet practitioners routinely estimate and use estimates of costs of capital all the time. It is similarly common for contracts to provide rights that have a range of potential values. As a result, it is common for there to be some degree of uncertainty associated with the precise value of a potential contract or contract term, the opportunity or option to acquire a business, or other common elements of a business transaction. That these estimates can only be derived with some uncertainty does not render estimation “virtually impossible,” as Professor Subramanian claims.²²⁹

141. Indeed, initial estimates of any loss or form of damage (at the time of a contract signing, and often at the time of breach) are inherently imprecise because they are estimates of counterfactuals—what would have happened had the loss-causing event not occurred. In such cases, what would have happened is generally not knowable “with great precision.” Nevertheless, it is quite common in practice (both outside of the litigation context as well as within it) to arrive at a reasonable estimate, or at least an estimated range, of the value of contract rights, business opportunities, or entire businesses. In other words, there are ways to arrive at an understanding of how to value a provision or to say that this is a reasonable range of outcomes. Courts do this all the time. The fact that some types of losses are challenging to estimate with “great precision,” or that they exhibit some degree of uncertainty, does not make them speculative or render unreliable

²²⁷ Subramanian Report, ¶ 101.

²²⁸ Amy Gallo, “A Refresher on Cost of Capital,” *Harvard Business Review*, April 30, 2015, available at <https://hbr.org/2015/04/a-refresher-on-cost-of-capital> (“[Cost of capital is] hardly an exact figure and is, in fact, a very theoretical calculation. ‘Like everything in finance it’s based on a lot of estimates and assumptions. It may look like a hard, fixed number — but it’s far from that.’”) (Last visited on February 23, 2024).

²²⁹ Subramanian Report, ¶ 101.

standard economic methods of measuring such losses.

142. Professor Subramanian fails to identify any uncertainties specific to this case that would make determining the outcome of a hypothetical negotiation between ARM and Qualcomm over the NUVIA ALA “extremely difficult,”²³⁰ or more difficult than cases in which damages are estimated. For example, Professor Subramanian denies that the parties’ prior negotiation leading up to this lawsuit would be informative because previously the “parties ... were negotiating only as to the benefit that would accrue to Qualcomm,” in contrast to a hypothetical post-lawsuit negotiation that would need to consider additional “factors [that] did not exist at the time of the prior negotiation.”²³¹ Both of these contentions are contradicted by the factual record in this case and even Professor Subramanian’s own negotiation theory.

143. Professor Subramanian’s contention that the parties’ prior negotiations solely concerned “the benefit that would accrue to Qualcomm (i.e., the assignment of the Nuvia ALA and Qualcomm’s use of Nuvia’s technology developed using Arm’s technology and IP under the Nuvia ALA)”²³² is unreliable because he not only fails to cite any support for this contention, but he also ignores relevant facts that undermine it. As an initial matter, given Qualcomm’s position that it did not need the NUVIA ALA to be assigned in order to continue developing NUVIA technology, it necessarily follows that the parties’ negotiations concerning assignment was in large part focused on benefits that, from Qualcomm’s view, would accrue to ARM.²³³ For example, during the parties’ negotiation, Qualcomm expressed its willingness to pay the higher NUVIA ALA royalty rate (rather than the lower Qualcomm ALA royalty rate) for server products.²³⁴ Qualcomm also expressed its willingness to consider paying a “transfer fee”—which, given Qualcomm’s position that a transfer was unnecessary—would solely be a benefit accruing to ARM.²³⁵ But even putting that issue aside, the factual record reflects that during the course of the parties’ prior negotiation,

²³⁰ Subramanian Report, ¶ 91.

²³¹ Subramanian Report, ¶ 92.

²³² Subramanian Report, ¶ 92.

²³³ *See, e.g.*, Defendants’ Answer and Defenses to Plaintiff’s Complaint, ¶ 24.

²³⁴ *See, e.g.*, Email chain from Will Abbey (ARM) to Paul Williamson (ARM), “Re: Follow up,” August 19, 2021, ARM_00045219–222 at ARM_00045221 (indicating Qualcomm’s willingness to pay “Nuvia ALA rates for v8/v9 datacenter (CPU and networking)”).

²³⁵ *Id.* (indicating Qualcomm’s willingness to pay “One-Time Transition Fee” of “\$50M”).

ARM made specific requests for higher royalties and supplemental payments that necessarily would have resulted in benefits that would accrue to ARM. For instance, ARM's internal documents reflect that during the course of the parties' prior negotiation, ARM was "[REDACTED]

[REDACTED]³⁶ ARM stated that Qualcomm was [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

144. Professor Subramanian's identification of "factors [that] did not exist at the time of the parties' prior negotiation" is also mistaken. These factors purportedly include: (i) "the harm to Arm given the public defection and breach of Arm's largest partner (Qualcomm)," ²⁴⁰ (ii) "the impact of Qualcomm's breach on other ALA licensees and potential licensees," (iii) "the potential for other ALA licensees to seek more favorable terms for themselves in view of Qualcomm's breach," and (iv) "the potential for other ALA licensees to take more extreme negotiating positions given Qualcomm's breach."²⁴¹ The error in Professor Subramanian's line of reasoning is that, even if these factors did not presently exist at the time of the prior negotiations between Qualcomm and

²³⁶ Email chain from Rene Haas (ARM) to Simon Segars (ARM), "RE: Draft note to Cristiano," May 28, 2021, ARM_00081932-933 at ARM_00081932.

²³⁷ Email chain from Rene Haas (ARM) to Simon Segars (ARM), "RE: Draft note to Cristiano," June 1, 2021, ARM_00081942-944 at ARM_00081943.

²³⁸ Compare Email chain from Simon Segars (ARM) to Cristiano Amon (Qualcomm), "Re: Follow up," June 29, 2021, ARM_00045219-22 at ARM_00045221-222 (ARM's June 29, 2021 offer) with "Settlement Proposal ALA Rates & Assignment Fee for Qualcomm," August 31, 2021, ARM_00000016-018 at ARM_00000018 (ARM's August 31, 2021 proposal).

²³⁹ [REDACTED]

²⁴⁰ Subramanian Report, ¶ 92. ARM's public disclosures indicate that it was aware of the risk that any issue with a major customer could significantly impact ARM. See, e.g., Arm Holdings plc, "Amendment No. 2 to Form F-1 Registration Statement," September 5, 2023, p. 13 ("A significant portion of our total revenue comes from a limited number of customers, which exposes us to greater risks than if our customer base were more diversified.").

²⁴¹ Subramanian Report, ¶ 92. Professor Subramanian further expands on these points in ¶¶ 93-100.

ARM, to the extent that they were necessary and predictable outcomes to a failed negotiation, as Professor Subramanian claims, they would have informed ARM's BATNA. I can think of no explanation, and Professor Subramanian offers none, why these factors would not be considerations that ARM would have taken into account at the time of the parties' prior negotiation. In fact, Professor Subramanian's comment that "Qualcomm's due diligence and acquisition bidding should have incorporated the possibility that Arm would trigger the [termination] provision if a renegotiated deal over the Nuvia licenses could not be completed"²⁴² further affirms that ARM too would have considered the aforementioned potential outcomes to a potential failed negotiation. Given that these factors could or should have been anticipated outcomes to a failed negotiation, their existence now does not render new learnings from the initial negotiation moot or make the outcome of another negotiation between ARM and Qualcomm "extremely difficult" to predict.²⁴³

F. Professor Subramanian Relies on Additional Assumptions or Assertions That Render His Analysis Incomplete and Unreliable.

145. Professor Subramanian also relies on a number of additional unsupported assumptions to reach his conclusions, further undermining the reliability of his report.

146. *First*, Professor Subramanian fails to offer any support for the broad proposition that it "may make sense, from a business perspective" for IP licenses to preclude a licensee from using "derivative[s]" upon contract termination, and that IP negotiations "need to address the use of derivative work based on the licensor's IP."²⁴⁴ Professor Subramanian's suggested possibility is not based on any analysis or evidence, much less analysis of evidence specific to any ARM ALA, and therefore cannot support any conclusion that one choice by a negotiating licensor would be more likely than the other. (If all Professor Subramanian means by "may" is that it is possible to imagine unusual settings where his claim could be true, then his claim "may" be true but is trivial and unconnected to this dispute.) As discussed above, it is difficult to square with customary business and M&A-planning practices the theoretical possibility that a start-up like NUVIA, which

²⁴² Subramanian Report, ¶ 71.

²⁴³ Subramanian Report, ¶ 91.

²⁴⁴ Subramanian Report, ¶ 49.

anticipated being acquired or conducting an initial public offering, to agree to a broad technology destruction provision that would require the discontinuance of all NUVIA's technology, irrespective of whether it contained ARM Confidential Information or not.

147. *Second*, Professor Subramanian's assertion about "unreasonable" withholding of consent under the NUVIA ALA is similarly contrasted by case facts. He notes that the NUVIA ALA [REDACTED]

[REDACTED]²⁴⁵ However, Professor Subramanian ignores that ARM's own employees believed such a requirement existed as a result of relevant background law, [REDACTED]

If the "unreasonable" standard is always applied, as certain ARM employees believed, the presence or the absence of it should not affect the ALA negotiation between NUVIA and ARM. Therefore, Professor Subramanian's application of negotiation theory to the NUVIA ALA with respect to this clause is irrelevant.

148. *Third*, Professor Subramanian's claim that, during the NUVIA ALA negotiations between NUVIA and ARM, NUVIA "traded across issues and offered what was cheap to give ... in exchange for what was valuable to receive" is unsupported.²⁴⁷ Based on my review of the record, I am not aware of any "trades" that NUVIA made of the termination provision for cost discounts, as Professor Subramanian posits.²⁴⁸ His claim on this point is speculative. As a matter of custom and practice, parties record "trades" in communications or memorialization of negotiations of those trades. Trades made during a negotiation, as Professor Subramanian claims occurred, are reflected in modifications to a given term of a deal. Here, Professor Subramanian points to no

²⁴⁵ Subramanian Report, ¶ 57.

²⁴⁶ Letter from Paul Williamson (ARM) to Ziad Asghar (Qualcomm), March 2, 2021, ARM 00032612 ("[REDACTED]

See also [REDACTED]

²⁴⁷ Subramanian Report, ¶ 64.

²⁴⁸ Subramanian Report, ¶ 64.

evidence that any discount was actually offered or agreed to by ARM. Nor does he point to any record evidence that [REDACTED] by the parties. In a negotiation, there would customarily be some explicit recognition of the term or provision supposedly being traded. Absent evidence of any explicit recognition of the trade claimed by Professor Subramanian, his claim remains pure speculation, and that speculation in any event cannot change the terms of the contracts actually negotiated.

VI. CONCLUSIONS

149. I conclude that Professor Subramanian's analysis and application of negotiation theory does not support the conclusion that the NUVIA and Qualcomm ALAs are [REDACTED] [REDACTED]²⁴⁹ In fact, Professor Subramanian does not provide sufficient support for his conclusion that ARM's ALAs were subject to individualized negotiations and reflect the parties' full and accurate business intentions. Professor Subramanian does not consider the rights granted by ARM to Qualcomm in its ALA.

150. Moreover, the fact that Qualcomm sought ARM's consent to assign NUVIA's license agreements does not indicate that consent was required in order to develop NUVIA technology.

151. Professor Subramanian's analysis of [REDACTED] is disconnected from the facts of this case and blurs customary differences between [REDACTED] [REDACTED].

152. Professor Subramanian also provides no support for his conclusion that the NUVIA ALA [REDACTED]

153. Professor Subramanian does not provide any basis for concluding that damages would be [REDACTED]

154. Finally, Professor Subramanian relies on additional assumptions or assertions that render his analysis incomplete and unreliable.

²⁴⁹ Subramanian Report, ¶ 65.

²⁵⁰ Subramanian Report, ¶ 101.

Executed this 27th day of February, 2024

A handwritten signature in black ink that reads "John Coates". The signature is written in a cursive style with a large, looping 'J' and a trailing flourish.

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Vice Dean for Finance and Strategic Initiatives	8/18 – 1/21, 10/21 – 7/22
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Supervising preparation of financial statements and budgets, developing strategic initiatives for online and executive education; led design and implementation of University-wide conflict of interest and conduct policies

John F. Cogan Jr. Professor of Law and Economics 6/06 – Present

Teaching and researching financial analysis, business valuation, accounting, contracts, mergers and acquisitions, corporations, governance, and finance

Professor of Law, Assistant Professor of Law 6/01 – 6/06, 6/97 - 6/01

Securities and Exchange Commission, Washington, D.C.

General Counsel	6/21 to 10/21
Director (Acting), Division of Corporation Finance	2/21 to 6/21
Independent Consultant (Compliance, Distribution of Fair Funds)	5/04 to 1/21
Investor Advisory Committee, Chair of Investor-as-Owner Subcommittee	5/17 to 6/20

Harvard Business School, Boston, MA

Lecturer, Executive Education Instructor (Finance, Boards, M&A)	9/11 – 1/21
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Independent compliance monitor for large financial institution
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Consultant, Newton, MA 6/97 to Present

Mergers and acquisitions, corporate governance, conflicts of interest

Public Company Accounting Oversight Board, Washington, D.C.

Consultant, academic referee for research conferences 7/12 to 1/18

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Partner	1/96 – 5/97
Associate (Full- or Part-Time)	3/88 – 6/89, 9/89 – 12/95

Managed teams for legal work on 50+ corporate mergers and acquisitions, recapitalizations, buyouts, freezeouts, and public offerings, managed disclosure and compliance "crises" at public companies

MEMBERSHIPS / AFFILIATIONS / AWARDS

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American Bar Association	Member, Section on Business Law
American Bar Foundation	Fellow
American College of Governance Counsel	Fellow
American Finance Association	Member
American Law and Economics Association	Member, Board of Directors
American Law Institute Corporate Governance Restatement	Adviser
Association of American Law Schools	Member
Committee on Capital Market Regulation	Task Force Member, Primary Author
Cornerstone Research	Affiliated Expert
European Corporate Governance Institute	ECGI Fellow, Board of Directors
Free Speech for People	Member, Legal Advisory Committee
Harvard Ad Hoc Group on Corporate Governance	Founding Member
Harvard University	Masters of Arts (Honoris Causa)
Harvard University Financial Regulatory Discussion Group	Member
National Bureau of Economic Research	Invited Speaker / Researcher
New York Stock Exchange	Member, Legal Advisory Board; Judge, Corporate Governance Awards
NYU School of Law Alumni Association	Teaching Award
Society for Empirical Legal Studies	Member
Society of Investment Law	Founding Member, Board Member

EDUCATION

New York University School of Law

J.D. Cum Laude, May 1989

New York University Law Review	1988-89 -- Editorial Board, Articles Editor
Law Review Alumni Association Award	George P. Foulk Memorial Award
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B.A. (History), Highest Distinction, May 1986

Thesis: "Christianity, Kingship and a Carolingian Lord"	Younger Prize for Distinction in History
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Congressional Testimony

Before the U.S. Senate Committee on Banking, Housing, and Urban Affairs to Examine Index Fund Voting (June 2022)

Before the U.S. Senate Committee on Banking, Housing, and Urban Affairs on Legislative Proposals to Examine Corporate Governance Securities Law Reforms (June 2018)

Before the U.S. Senate Subcommittee on Securities, Insurance and Investment on Proposed Securities Law Reforms (December 2011)

Before the Committee on House Administration, House of Representatives on the Disclose Act (H.R. 5175) (May 2010)

Before the U.S. Senate Subcommittee on Securities, Insurance and Investment of the Committee on Banking, Housing and Urban Affairs on Financial Regulatory Reform (July 2009)

PUBLICATIONS

SPAC Law and Myths, *Business Lawyer* (2023)

THE PROBLEM OF TWELVE: INDEX FUNDS, PRIVATE EQUITY AND CORPORATE GOVERNANCE, Columbia Global Press (2023)

Corporate Governance, Core Reading for MBA Program, Harvard Business Publishing (2018) (with Suraj Srinivasan)

The M&A Process, Core Reading for MBA Program, Harvard Business Publishing (2017)

The Volcker Rule as Structural Law: Implications for Cost-Benefit Analysis and Administrative Law, 10 *Capital Markets Law Journal* 447 (2015)

M&A Contracts: Purposes, Types, Regulation and Patterns of Practice (April 2014), in RESEARCH HANDBOOK ON MERGERS AND ACQUISITIONS (Claire Hill and Steven Davidoff Solomon, eds., Edward Elgar 2015)

Corporate Speech and the First Amendment: History, Data and Implications, 30 *Constitutional Commentary* 223 (2015)

Securities Litigation in The Roberts Court: An Early Assessment, 57 *Arizona Law Review* 1 (2015)

Mergers, Acquisitions, and Restructuring: Types, Regulation, and Patterns of Practice (July 2014), in OXFORD HANDBOOK ON CORPORATE LAW AND GOVERNANCE (eds. J. Gordon and G. Ringe Oxford University Press 2015)

Thirty Years of Evolution in the Roles of Institutional Investors in Corporate Governance (May 2014), in RESEARCH HANDBOOK ON SHAREHOLDER POWER (Jennifer Hill and Randall Thomas, eds., Edward Elgar 2015)

Towards Better Cost-Benefit Analysis: An Essay on Regulatory Management, 78 *Law and Contemporary Problems* 1 (2015)

Cost-Benefit Analysis of Financial Regulation: Case Studies and Implications, 124 *Yale Law Journal* 882 (2014-2015)

What Courses Should Law Students Take? Harvard's Largest Employers Weigh In, 64 *Journal of Legal Education* (2014) (with Jesse Fried and Kathryn Spier)

SOX After Ten Years: A Multidisciplinary Review, 28:3 *Accounting Horizons* 627 (2014) (with Suraj Srinivasan)

Corporate Politics, Governance, and Value Before and After *Citizens United*, 9 *Journal of Empirical Legal Studies*, 657-696 (2012), selected as one of 10 best securities law articles published during 2012-13 by academics surveyed

Evidence-based M&A: Less Can Be More When Allocating Risk in Deal Contracts, 27 *Journal of International Banking, Finance and Law* 708 (2012)

Managing Disputes Through Contract: Evidence from M&A, *Harvard Business Law Review*, Vol. 2, pp. 301-349 (2012)

Hiring Teams, Firms and Lawyers: Evidence of the Evolving Relationships in the Corporate Legal Market, 36 *Law & Social Inquiry* 999-1031 (2011) (with Michele DeStefano, Ashish Nanda and David B. Wilkins)

M&A Break Fees: U.S. Litigation versus U.K. Regulation, in REGULATION VERSUS LITIGATION: PERSPECTIVES FROM ECONOMICS AND LAW, Daniel Kessler, ed. Chicago: University of Chicago Press (2011)

Corporate Purchasing Project: How S&P Companies Evaluate Outside Counsel (A White Paper), Harvard Law School Program on the Legal Profession (2011) (with Michele DeStefano Beardslee, Ashish Nanda, Erik Ramanathan and David B. Wilkins)

Fulfilling Kennedy's Promise: Why the SEC Should Mandate Disclosure of Corporate Political Activity, 2011 (with Taylor Lincoln)

The Downside of Judicial Restraint: The (Non-) Effect of *Jones v. Harris*, 6 Duke J. of Constitutional Law and Public Policy 58 (2010)

Reforming the Taxation and Regulation of Mutual Funds: A Comparative Legal and Economic Analysis, 1 *J. Legal Anal.* 591 (Summer 2009)

Lowering the Cost of Bank Recapitalization, 26 *Yale J. Reg.* 373 (Summer 2009) (with David Scharfstein)

The Keynote Papers and the Current Financial Crisis, 47 *J. Acctg. Res.* 427 (May 2009)

Competition in the Mutual Fund Industry: Evidence and Implications for Policy, 33 *J. Corp. L.* 151 (2008) (with R. Glenn Hubbard)

The Goals and Promise of the Sarbanes-Oxley Act, 21 *J. Econ. Persp.* 91 (Winter 2007)

Ownership, Takeovers and EU Law: How Contestable Should EU Corporations Be?, in *COMPANY AND TAKEOVER LAW IN EUROPE*, eds. E. Wymeersch & G. Ferrarini (Oxford University Press 2004)

The Powerful Antitakeover Force of Staggered Boards: Further Findings and a Reply to Symposium Participants, 55 *Stan L. Rev.* 885 (2003) (with Lucian A. Bebchuk and Guhan Subramanian), selected as one of 10 best corporate law articles published during 2003 by academics surveyed

The Trouble with Staggered Boards: A Reply to Georgeson's John Wilcox, *Corporate Governance Advisor* (2002) (with Lucian A. Bebchuk and Guhan Subramanian)

The Powerful Antitakeover Force of Staggered Boards: Theory, Evidence and Policy, 54 *Stan. L. Rev.* 887 (2002) (with Lucian A. Bebchuk and Guhan Subramanian), selected as one of 10 best corporate law articles published during 2002 by academics surveyed

Explaining Variation in Takeover Defenses: Blame the Lawyers, 89 *Cal. L. Rev.* 1301 (2001), selected as one of 10 best corporate law articles published during 2002 by academics surveyed, reprinted in *MERGERS AND THE MARKET FOR CORPORATE CONTROL*, ed. Fred S. McCheney (Edward Elgar 2010) and in *LAW AND ECONOMICS OF MERGERS AND ACQUISITIONS* (eds. Steven M. Davidoff and Claire A. Hill, Edward Elgar 2013)

Private vs. Public Choice of Securities Regulation: A Political Cost/Benefit Analysis, 41 *Va. J. Int'l L.* 531 (2001), selected as one of 10 best securities law articles published during 2001 by academics surveyed

Second-Generation Shareholder Bylaws: Post-*Quickturn* Alternatives, 56 *Bus. Law.* 1323 (2001) (with Bradley C. Faris)

A Buy-Side Model of M&A Lockups: Theory and Evidence, 53 *Stan. L. Rev.* 307 (2000) (with Guhan Subramanian)

Takeover Defenses in the Shadow of the Pill: A Critique of the Scientific Evidence on Takeover Defenses, 79 *Tex. L. Rev.* 271 (2000), reprinted in 43 *Corp. Practice Commentator* 1 (2002) as one of 10 best corporate law articles published in 2001-02 by academics surveyed

Empirical Evidence on Structural Takeover Defenses: Where do We Stand?, 54 *U. Miami L. Rev.* 783 (2000)

"Fair Value" as a Default Rule of Corporate Law: Minority Discounts in Conflict Transactions, 147 *U. Penn. L. Rev.* 1251 (1999), reprinted in 41 *Corp. Practice Commentator* 1 (2000) and selected as one of 10 best corporate law articles published in 1999-2000 by academics surveyed

Measuring the Domain of Mediating Hierarchy: How Contestable Are US Public Corporations?, 24 *J. Corp. L.* 837 (1999)

Freezeouts, Management Buyouts and Going Private, in *TAKEOVERS & FREEZEOUTS* (eds. M. Lipton & E. Steinberger, Law Journal Seminars-Press 1998)

Reassessing Risk-Based Capital in the 1990s: Encouraging Consolidation and Productivity, in *BANK MERGERS AND ACQUISITIONS* (eds. Y. Amihud & G. Miller, Kluwer Academic Publishers 1998)

Purchase Accounting Deals: A Look at Pricing Formulas and Allocation Procedures, 15 *Banking Policy Report* 1 (Nov. 18, 1996) (with Edward Herlihy, et al.)

Acquisitions of Financial Advisory and Investment Management Businesses, 17 *Bank & Corp. Gov. L. Rep.* 8 (Sep. 1996) (with Edward Herlihy et al.)

New Guidance for Freezeouts and MBOs -- Negotiation Strategy Privileged from Disclosure, *Corp. Rep.* (Aspen Law & Business (June 1996) (with Paul Rowe)

M&A Strategies, 9 *Bank Accounting and Finance* 40 (Winter 1995-96) (with Edward Herlihy, et al.)

Bank M&A Preparedness, 66 *Corp. Rep.* 1 (Aspen Law & Business Nov. 15, 1995) (with Edward Herlihy, et al.)

Mergers and Acquisitions of Financial Institutions -- 1995: An Unprecedented Year of Consolidation, *Securities Activities of Banks, Fifteenth Annual Institute* (1995) (with Edward Herlihy, et al.)

Deal Developments Update, *Corporate Control Alert* (August 1995) (with Edward Herlihy et al.)

Updating the Use of Special Committees in Freeze-Outs and Other Conflict Transactions, *Corp. Rep.* (Aspen Law & Business Aug. 15, 1995)

Banking on Nonbank Acquisitions, *The Community Banker* 46 (Second Quarter 1995)

Fundamental Rules for Bank Merger Transactions Remain Unchanged After Paramount, in *Banking Expansion Institute, Thirteenth Annual* (Aspen Law & Business 1995) (with Edward Herlihy, et al.)

Bank and Thrift Mergers and Acquisitions -- 1994, in *Securities Activities of Banks, Prentice-Hall Law & Business, Fourteenth Annual Institute* (1994) (with Edward Herlihy, et al.)

Stock Buybacks: Strategic, Legal and Fiduciary Issues, 8 *Insights* 10 (Nov. 1994) (with Edward Herlihy et al.)

Concentration Limits: New Interstate Moves Still Face Minefield of Deposit Cap Statutes, in a Special Report on Interstate Banking, 13 *Banking Policy Rep.* 23 (Aug. 15, 1994) (with David Neill)

Mergers of Equals: Achieving a Delicate Balance of Control, 13 *Banking Policy Report* 1 (Oct. 3, 1994) (with Edward Herlihy et al.)

Banking on Non-Bank Acquisitions and Current Issues in Bank Acquisitions, in *Bank Mergers and Acquisitions, Practicing Law Institute* (1994) (with Edward Herlihy, et al.)

Current Issues in Bank Acquisitions, 7 *Bank Acct'g & Fin.* 44 (Spring 1994) (with Edward Herlihy et al.)

Recent Deals Feature New Pricing Formulas, 13 *Banking Pol. Rep.* 2 (Apr. 4, 1994) (with Edward Herlihy et al.) M&A Strategies, 7 *Bank Accounting & Finance* 48 (Winter 1993- 94) (with Edward Herlihy et al.)

Assessing the Current Bank Merger Environment: A Preparedness Checklist, 12 *Banking Policy Report* 1 (Oct. 18, 1993) (with Herlihy et al.)

Bank Mergers and Acquisitions -- 1993: A Year of Increasing Franchise Consolidation, in *Securities Activities of Banks, Prentice-Hall Law & Business, 13th Annual Institute* (1993) (with Edward Herlihy, et al.)

Hostile Acquisition Overtures at Smaller Banks and Thrifts, 11 *Bank & Corp. Gov. L. Rep.* 47 (1993) (with Herlihy et al.) Flexibility on Safety and Soundness, 3 *Bank Director* 3 (Third Quarter 1993) (with Craig Wasserman)

Designing Bank Governance Structures, 12 Bank Policy Report (Apr. 19, 1993) (with Edward Herlihy et al.)

Capital and Compliance Strategies in the Era of Prompt Corrective Action, in *The New Implementing Regulations Under FDICIA* (Prentice Hall 1992) (with Craig Wasserman et al.)

1992 -- A Year of Continuing Financial Industry Consolidation: Current Trends and Various Considerations in Bank Mergers and Acquisitions, in Securities Activities of Banks, Prentice-Hall Law & Business, Twelfth Annual Institute (1992) (with Edward Herlihy, et al.)

Bank Regulators Turn Up Intensity in Examination of Racial Discrimination in Lending Practices, 9 Bank & Corp. Governance L. Rep. 758 (December 1992) (with Warren Stern et al.)

Meeting the Challenge of Loan Bias Scrutiny, Am. Banker (August 21, 1992) (with Warren Stern et al.)

Investment Company Act Exemption Proposed, 11 Int'l Fin. L. Rev. 41 (July 1992) (with Eric Robinson)

Dealing with Market Risks in Stock Mergers: Collars and Walkaways, 6 Insights 4 (July 1992) (with Edward Herlihy et al.)

Market Risks in Bank Mergers, 1 Bank Governance L. Rep. 1114 (July 1992) (with Edward Herlihy et al.)

Racial Discrimination in Lending Practices, 1 Bank Gov. L. Rep. 1114 (July 1992) (with Warren Stern et al.)

Disclosure of the Analyses Underlying Investment Banker Fairness Opinions, 6 Insights 11 (March 1992) (with Edward Herlihy et al.)

Federal Reserve Board Approval Criteria for Bank Mergers, 7 Bank & Corp. Governance L. Rep. 45 (1992) (with Edward Herlihy et al.)

Consensus Needed on Early Resolution's Legal Issues, Am. Banker (Mar. 25, 1992) (with Craig Wasserman)

An Overview of Current Trends and Various Considerations in Bank Mergers and Acquisitions, in Securities Activities of Banks, Prentice-Hall Law & Business, Eleventh Annual Institute (1991) (with Edward Herlihy et al.)

Management Buyouts and the Duties of Independent Directors to Shareholders and Creditors, in Corporate Deleveragings and Restructurings, Practising Law Institute (1991) (with Lawrence Lederman et al.)

ANNUAL SURVEY OF DEVELOPMENTS IN MERGERS AND ACQUISITIONS OF FINANCIAL INSTITUTIONS 1990-1998 (with Herlihy et al.) (co-authored leading annual survey for eight years; privately published)

Liabilities Under Sections 11, 12, 15 and 17 of the Securities Act of 1933 and Sections 10, 18 and 20 of the Securities Exchange Act of 1934, in Introduction to Securities Law 1990, Practising Law Institute (1990) (with Paul Vizcarrondo et al.)

Advising the Board of Directors of a Target Company Regarding Defensive Strategies, in Dynamics of Corporate Control IV, American Bar Association National Institute (1989) (with James Fogelson)

State Takeover Statutes and Corporate Theory: The Revival of an Old Debate, 64 N.Y.U. L. Rev. 806 (1989)

State Takeover Statutes: A Fifty-State Survey (privately published) (1989) (with Eric Robinson et al.)

The Reorganization Plan: Statutory Framework and Commercial Realities, in Business Reorganizations and Workouts, Law Journal Seminars-Press (1988) (with Meyer Koplow)

Working Papers

Reverse Termination Fees in M&A: Design, Signals, and Bidder Returns, Working Paper (August 2017) (with Darius Palia and Ge Wu)

Why Have M&A Contracts Grown? Evidence from Twenty Years of Deals, Working Paper (September 2016)

Quantifying Foreign Institutional Block Ownership at Publicly Traded U.S. Corporations, Working Paper (September 2016) (with Ron Fein, Kevin Crenny, and L. Vivian Dong)

Allocating Risk Through Contract: Evidence from M&A and Policy Implications (August 2012)

The Link between the Acquisitions Market and the Market for CEOs (January 2011) (with Reinier Kraakman) The

Powerful and Pervasive Effects of Ownership on M&A, Olin Center Discussion Paper No. 669 (June 2010)

An Empirical Reassessment of MBO Bids: Techniques, Outcomes, and Delaware Corporate Law, Working Paper (October 2005)

Why Are Firms Sold? The Role of the Target CEO's Age, Tenure, And Share Ownership, Working Paper (October 2005) (with Reinier Kraakman)

The Legal Origins of the Politically Puzzling U.S. "Market" for Corporate Charters, Working Paper (October 2004)

The Power of Defenses, National Bureau of Economics Research Working Paper (July 2003) (with Lucian Arye Bebchuk and Guhan Subramanian)

CEO Incentives and M&A Activity in the 1990s: Stock Options and Real Options, Working Paper (March 2002) (with Reinier Kraakman)

An Index of the Contestability of Corporate Control: Studying Variation in Legal Takeover Vulnerability, Working Paper (June 1999)

Case Studies, available at:

<http://www.law.harvard.edu/academics/post-grad/case-studies/products/available-cases-online/index.html>

Emery Celli Brinckerhoff & Abady (2011)

Hilton's Hostile Bid for ITT (2011)

In a Pickle: Barclays Capital and the Sale of Del Monte Foods (with Clayton Rose and David Lane) (2011)

Barclays Capital and the Sale of Del Monte Foods (with Clayton Rose and David Lane) (2012)

El Paso's Sale to Kinder Morgan (with Clayton Rose and David Lane) (2012)

Slater & Gordon (with Ashish Nanda and Monet Brewerton) (2012)

Workers' Rights in the Hudson Valley (with Sara Del Nido) (2012)

IBM's Hostile Bid for Lotus (2013)

Cerberus Tries to Walk Away from United Rentals (2014)

AmesCard (with Karina Shaw) (2015)

When a Deal Goes Bad: Integrated Services (2016)

Allergan Board Under Fire (with Lynn S. Paine, Suraj Srinivasan, and David Lane) (2016)

A Difficult Discussion with the Board (2016)

After the Sale (2016)

GE Capital After the Crisis (with David Scharfstein and John Dionne) (2017)

After the Purchase (2017)

“Knowledge is King” in the Texas Oil Patch (2019)

A Tale of a Tail (2019)

Silver Lake Bids for Dell (2019)

J&J Bids for Guidant (2019)

Jockeying for Mobile Dominance Together: Microsoft and Nokia (with Rachel Gordon) (2020)

Columns, op eds, and other short works

Law Firms and Russian Profits (2022) (with Ian Ayres and Robert Daines)

Proposal on Climate-Related Disclosures Falls Within the SEC's Authority, Harvard Corporate Governance Forum (June 22, 2022)

Petition to SEC on Human Capital, Working Group On Human Capital Accounting Disclosure Petition for Rulemaking (June 7, 2022)

SPAC Law and Myths, Harvard Corporate Governance Forum (February 28, 2022)

New SEC chair needs to tackle these 5 big issues, *MarketWatch* (Dec. 17, 2020)

Recommendation from the Investor-as-Owner Subcommittee of the SEC Investor Advisory Committee Relating to ESG Disclosure, Harvard Corporate Governance Forum (May 28, 2020) (with Allison Bennington and Anne Sheehan)

Corporations Like Exxon Are Using Spurious Free Speech Claims to Fend Off Regulation, *Vox* (Feb 14, 2017) (with Jeff Clements)

Corporations Are Perverting the Notion of Free Speech, *Newsweek* (Aug. 4, 2015) (with Ron Rein)

Bill to Help Businesses Raise Capital Goes Too Far, *Washington Post* (March 14, 2012) (with Robert Pozen)

Fulfilling the Promise of “Citizens United,” *Washington Post* (September 6, 2011) (with Taylor Lincoln), republished in *Business Ethics* (Sep. 2011)

Corporate Governance After the Financial Crisis, Proceedings of the 2010 Annual Symposium: Legal Aftershocks of the Global Financial Crisis, 6 *NYU J. of Law & Business* 171 (2010)

A Costly Lesson in the Rule of ‘Loser Pays’, *Financial Times* (November 2, 2009)

The Bailout is Robbing the Banks, *New York Times* (February 18, 2009) (with David Scharfstein)

The Greatest American Shambles: An Exchange, 38 *N.Y. Rev. of Books* 59 (June 13, 1991)

Trial Testimony and Depositions February 23, 2020 to February 23, 2024

Ahmed D. Hussein v. Sheldon Razin, Steven Plochocki, Quality Systems, Inc., Superior Court of the State of California, For the County of Orange, Case No. 30-2013-00679600-CU-NP-CJC, Deposition 6/16/15, Trial Testimony 6/16/17, Deposition 1/21/21

Energy Transfer LP, formerly known as Energy Transfer Equity, L.P. and LE GP, LLC v. Williams Companies, Inc., Delaware Chancery Court, C.A.No.12168-VCG, C.A.No.12377-VCG, Deposition 7/10/20, Trial Deposition 1/29/21

Thompson Petroleum Corporation, J. Cleo Thompson, and James Thompson, JR., L.P., v. Paul Rudnicki v. Linda Thompson Gordon, Jean Christine Thompson and Dorothy Kuntz Thompson, United States 6th Judicial District Court, District of Dallas County, Texas, Cause No. DC-18-00644, Deposition 7/17/20

MAPS Hotels and Resorts One, LLC, Mirae Asset Capital Co., LTD, Mirae Asset Daewoo Co., LTD., Mirae Asset Global Investments, Co., LTD., and Mirae Asset Life Insurance Co., LTD., v. AB Stable VIII LLC, Delaware Chancery Court, C.A. No. 2020-0310-JTL, Deposition 8/14/20

Perspecta Inc. v. DXC Technology Company, International Institute for Conflict and Resolution, Deposition 9/2/20, Trial Testimony 10/2/20

Autoridad Del Canal De Panama v. Grupo Unidos Por El Canal, S.A., Sacyr S.A., Salini-Impregilo S.P.A., Jan De Nul N.V., and Constructora Urbana, S.A., ICC Case No. 22465/ASMA/JPA (C-22966/JPA), Trial Testimony 3/31/22 & 4/1/22

FSG Services LLC v. Flutter Entertainment, plc, Judicial Arbitration and Mediation Services, Reference No. 1425034540, Trial Testimony 7/6/22

Politan Capital Management LP, et al., v. Masimo Corporation, et al., No. 2022-0948-NAC, Deposition 2/4/23

In re EQT Corporation Securities Litigation, No. 2:19-cv-00754-RJC, United States District Court, Western District of Pennsylvania, Deposition 10/31/23

Ohio Public Employees Retirement System v. Federal Home Loan Mortgage Corporation, No. 4:08-cv-00160-BYP, United States District Court, Northern District of Ohio, Deposition 2/20/24

In re Qualcomm Incorporated Securities Litigation, No. 3:17-cv-00121-JO-MSB, United States District Court, Southern District of California, Deposition 2/23/24

List of Materials Considered

Legal

- ARM's Second Supplemental ALA Redaction Log, December 26, 2023.
- ARM's Third Supplemental ALA Redaction Log, January 5, 2024.
- Complaint, *Arm Ltd. V. Qualcomm Inc., et al.*, United States District Court for the District of Delaware, Case No. 1:22-cv-01146, Doc. No. 1, August 31, 2022.
- Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Counterclaim, *Arm Ltd. V. Qualcomm Inc., et al.*, United States District Court for the District of Delaware, Case No. 1:22-cv-01146, Doc. No. 18, October 26, 2022.
- Memorandum and Order, *SQL Solutions, Inc. v. Oracle Corporation, et al.*, United States District Court, N.D. California, Case No. C-91-1079 MHP, 1991 WL 626458, December 18, 1991.
- Memorandum and Order, *The Williams Companies Stockholder Litigation*, Court of Chancery of the State of Delaware, Case No. 2020-0707-KSJM, 2021 WL 754593, February 26, 2021.
- Non-Party Ampere Computing LLC's Section Motion for Protective Order to Maintain Redactions of Competitively Sensitive Commercial Information, *Arm Ltd. V. Qualcomm Inc., et al.*, United States District Court for the District of Delaware, Case No. 1:22-cv-01146, Doc. No. 240, January 8, 2024.
- Order, *In re Starz Appraisal*, Court of Chancery of the State of Delaware, Case No. 12968-VCG, 2018 WL 4922095, October 10, 2018.

Expert Reports

- Expert Report of Professor Guhan Subramanian, December 20, 2023.

Depositions

- Deposition of Manu Gulati, October 12, 2023.
- Deposition of Tim Herbert, October 25, 2023.
- Deposition of Will Abbey, October 27, 2023.
- Deposition of Gerard Williams III, November 3, 2023.
- Deposition of Ziad Asghar, November 8, 2023.
- Deposition of Paul Williamson, November 9, 2023.
- Deposition of Cristiano Amon, November 15, 2023.
- Deposition of Richard Grisenthwaite, November 15, 2023.
- Deposition of Simon Segars, November 16, 2023.
- Deposition of James Thompson, November 28, 2023.

- Deposition of Rene Haas, December 12, 2023.

Academic Articles and Books

- Alice J. Lee and Daniel Ames, “‘I can’t pay more’ versus ‘It’s not worth more’: Divergent Effects of Constraint and Disparagement Rationales in Negotiations,” *Organizational Behavior and Human Decision Processes* 141, 2017, pp. 16–28.
- Barry Nalebuff, *Split the Pie: A Radical New Way to Negotiate* (New York, Harper Business, 2022).
- Blanka Börzsönyi, “Intellectual Property Considerations in M&A Due Diligence,” *Annales Universitatis Scientiarum Budapestinensis de Rolando Eötvös Nominatae* 58, 2019, pp. 89–99.
- Chester L. Karrass, *Give and Take: The Complete Guide to Negotiating Strategies and Tactics* (New York, NY: Crowell, 1974).
- David A. Lax and James K. Sebenius, *The Manager as Negotiator* (New York: The Free Press, 1986).
- Deepak Malhotra and Max H. Bazerman, *Negotiation Genius* (New York: Bantam Dell, 2008).
- Elaine D. Ziff and John G. Deming, “IP Licenses: Restrictions on Assignment and Change of Control,” *Practical Law Company*, 2012.
- Guhan Subramanian and Rhea Ghosh, “Remicade/Simponi: Legal Memorandum,” HBS Case Study N9-911-046, July 13, 2012.
- Guhan Subramanian, “Bargaining in the Shadow of Takeover Defenses,” *Yale Law Journal* 113, no. 3, 2003, pp. 621–686.
- Guhan Subramanian, *Dealmaking: The New Strategy of Negotiauctions*, Second Edition (New York: W. W. Norton & Company, 2020).
- Howard Raiffa, *The Art and Science of Negotiation* (Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 1982).
- Ian Ayres and Barry Nalebuff, “Common Knowledge as a Barrier to Negotiation,” *UCLA Law Review* 44, 1997, pp. 1631–1660.
- John Coates, “M&A Contracts: Purposes, Types, Regulation, and Patterns of Practice,” Working Paper, 2015.
- John Nash, “Two-Person Cooperative Games,” *Econometrica* 21, no. 1, 1953, pp. 128–140.
- Kenneth Ayotte and Henry Hansmann, “Legal Entities as Transferable Bundles of Contracts,” *Michigan Law Review* 111, 2013, pp. 715–758.
- *Law and Economics of Mergers and Acquisitions*, ed. Steven Davidoff Solomon and Claire A. Hill (United Kingdom: Edward Elgar Publishing, 2013).
- Leigh L. Thompson, *Negotiation of Theory and Research* (New York, NY: Psychology Press, 2006).

- Leland Crabbe, “Event Risk: An Analysis of Losses to Bondholders and ‘Super Poison Put’ Bond Covenants,” *The Journal of Finance* 46, no. 2, 1991, pp. 689–706.
- Manju Puri and Rebecca Zarutskie, “On the Life Cycle Dynamics of Venture-Capital- and Non-Venture-Capital-Financed Firms,” *Journal of Finance* 67, no. 6, 2012, pp. 2247–2293.
- Martin B. Robins, “Intellectual Property and Information Technology Due Diligence in Mergers and Acquisitions: A More Substantive Approach Needed,” *Journal of Law, Technology and Policy*, 2008, pp. 321–356.
- Michael Klausner and Guhan Subramanian, *Deals: The Economic Structure of Business Transactions*, Page Proofs (Cambridge, MA: Harvard University Press, forthcoming).
- Oliver Hart and John Moore, “Contracts as Reference Points,” *Quarterly Journal of Economics* 123, no. 1, 2008, pp. 1–48.
- Roger B. Myerson and Mark A. Satterthwaite, “Efficient Mechanisms for Bilateral Trading,” *Journal of Economic Theory* 29, 1983, pp. 265–281.
- Stephen J. Choi and G. Mitu Gulati, “Contract as Statute,” *Michigan Law Review* 104, no. 5, 2006, pp. 1129–1174.
- Vincent P. Crawford, “A Theory of Disagreement in Bargaining,” *Econometrica* 50, no. 3, 1982, pp. 607–637.

Produced Documents

- ARM_00000016
- ARM_00000017
- ARM_00000019
- ARM_00000020
- ARM_00000224
- ARM_00002358
- ARM_00002374
- ARM_00003124
- ARM_00025394
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- ARM_00026976
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APPENDIX C

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APPENDIX C

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- QCARM_0020012
- QCARM_0213867
- QCARM_0276442
- QCARM_0338573
- QCARM_0343120
- QCARM_2420399
- QCARM_2422447
- QCARM_3314368
- QCARM_3315932
- QCARM_3520220
- QCARM_3835058
- QCARM_3839896
- QCARM_3972031
- QCARM_7467691

Public Documents

- “Amended and Restated Stockholders Agreement By and Among Savers Value Village, Inc., Ares Corporate Opportunities Fund V, L.P., ASSF IV AIV B, L.P., ASOF

- Holdings I, L.P., Amari Investment PTE. Ltd. and ASSF IV AIV B Holdings III, L.P.,” 2023, available at <https://www.sec.gov/Archives/edgar/data/1883313/000119312523142205/d264743dex41.htm>.
- Amy Gallo, “A Refresher on Cost of Capital,” *Harvard Business Review*, April 30, 2015, available at <https://hbr.org/2015/04/a-refresher-on-cost-of-capital>.
 - Amy Thomson, “Tesco Abandons Video-Streaming Ambitions in Blinkbox Sale,” *Bloomberg*, January 8, 2015, available at <https://www.bloomberg.com/news/articles/2015-01-08/tesco-abandons-video-streaming-ambitions-in-blinkbox-sale>.
 - Anand Lal. Shimpi, “The ARM Diaries, Part 1: How ARM’s Business Model Works.” *AnandTech*, June 28, 2013, <https://www.anandtech.com/show/7112/the-arm-diaries-part-1-how-arms-business-model-works>.
 - “Anticipated Acquisition by Nvidia Corporate of ARM Limited: Initial Submission” December 20, 2021, available at https://assets.publishing.service.gov.uk/media/61d81a458fa8f505953f4ed7/NVIDIA-Arm_-_CMA_Initial_Submission_-_NCV_for_publication__Revised_23_December_2021_.pdf.
 - Arm Holdings plc, “Amendment No. 2 to Form F-1 Registration Statement,” September 5, 2023, available at <https://www.sec.gov/Archives/edgar/data/1973239/000119312523228059/d393891df1a.htm>.
 - Centocor/Schering-Plough Distribution Agreement, April 3, 1998, attached to Schering Plough Corp. Form 10-K, February 26, 2004.
 - Christine Perkins, “Subramanian Will Succeed Mnookin as Program on Negotiation Chair.” *Harvard Law Today*, March 15, 2018, available at <https://hls.harvard.edu/today/subramanian-will-succeed-mnookin-program-negotiation-chair>.
 - “Co-Investment Agreement by and among Chart Industries, Inc., ISQ HoldCo Limited, and ISQ Blueprint Acquisitions Inc.,” September 7, 2021, available at <https://www.sec.gov/Archives/edgar/data/892553/000089255321000133/gtls-20210930x10qexx101.htm>.
 - David Manners, “ARM Adds an Architectural Licensee,” *Electronics Weekly*, April 21, 2015, available at <https://www.electronicsworld.com/news/business/finance/arm-adds-architecturallicensee-2015-04>.
 - “Dear Negotiation Coach: Coping with a Change-of-Control Provision,” *Harvard Program on Negotiation*, July 31, 2023, available at <https://www.pon.harvard.edu/daily/businessnegotiations/dear-negotiation-coach-coping-with-a-change-of-control-provision-nb>.
 - Elaine McArdle, “Bridging Theory and Practice in Corporate Law,” *Harvard Law Bulletin*, January 24, 2012, available at <https://hls.harvard.edu/today/bridging-theory-and-practice-in-corporate-law>.

- “Fortune 500,” *Fortune*, 2023, available at <https://fortune.com/ranking/fortune500/2023/search/?Name=lkq>.
- David Foxen, “Adobe Licensing Quick Guide,” *ITA Asset Management*, available at <https://www.itassetmanagement.net/wp-content/uploads/2014/07/Adobe-Licensing-Quick-Guide.pdf>.
- Gregg Keizer, “HP Must Give Up Beats Audio After Apple Deal,” *Computerworld*, May 29, 2014, available at <https://www.computerworld.com/article/2489984/hp-must-give-up-beats-audio-after-apple-deal.html>.
- Kavita Kumar, “Target Is Shedding Merona and Mossimo and Adding New Brands Instead,” *Los Angeles Times*, August 21, 2017, available at <https://www.latimes.com/business/la-fi-target-merona-mossimo-20170821-story.html>.
- “Lectures & Symposia,” *Delaware Journal of Corporate Law*, available at <https://djcl.org/symposiumlectures>.
- “Licensing Arm Technology: Access for Everyone,” *Arm*, available at <https://www.arm.com/products/licensing>.
- “Licensing Options for Industries—Education,” *Microsoft*, available at <https://www.microsoft.com/en-us/licensing/licensing-programs/licensing-for-industries?activetab=licensing-forindustries-pivot:primaryr3>.
- “Licensing Options for Industries—Government,” *Microsoft*, available at <https://www.microsoft.com/en-us/licensing/licensing-programs/licensing-for-industries?activetab=licensing-forindustries-pivot:primaryr2>.
- “Licensing Options for Industries—Nonprofit,” *Microsoft*, available at <https://www.microsoft.com/en-us/licensing/licensing-programs/licensing-for-industries?activetab=licensing-forindustries-pivot:primaryr4>.
- “LKQ Corporation Announces Agreement to Acquire Rhiag-Inter Auto Parts Italia S.p.A.,” *GlobeNewswire*, December 22, 2015, available at <https://www.globenewswire.com/news-release/2015/12/22/797609/0/en/LKQ-Corporation-Announces-Agreement-to-Acquire-Rhiag-Inter-Auto-Parts-Italia-S-p-A.html>.
- “LKQ Corporation Announces Agreement to Acquire Stahlgruber GmbH,” *GlobeNewswire*, December 11, 2017, available at <https://www.globenewswire.com/news-release/2017/12/11/1250656/0/en/LKQ-Corporation-Announces-Agreement-to-Acquire-Stahlgruber-GmbH.html>.
- “LKQ Corporation Enters into Definitive Agreement to Acquire Uni-Select Inc.,” *Uni-Select*, February 27, 2023, available at <https://uniselect.com/content/files/LKQ-Corp-Acquisition-of-Uni-Select-Press-Release-Final.pdf>.
- “LKQ Corporation Finalizes Acquisition of Rhiag-Inter Auto Parts Italia S.p.A.,” *GlobeNewswire*, March 21, 2016, available at <https://www.globenewswire.com/news-release/2016/03/21/821696/0/en/LKQ-Corporation-Finalizes-Acquisition-of-Rhiag-Inter-Auto-Parts-Italia-S-p-A.html>.

- “LKQ Corporation Finalizes Acquisition of Sator Beheer,” *GlobeNewswire*, May 1, 2013, available at <https://www.globenewswire.com/news-release/2013/05/01/543410/10030936/en/%20LKQ-Corporation-Finalizes-Acquisitionof-Sator-Beheer.html>.
- “LKQ Corporation Finalizes Acquisition of Stahlgruber GmbH,” *GlobeNewswire*, May 31, 2018, available at <https://www.globenewswire.com/news-release/2018/05/31/1514504/0/en/LKQCorporation-Finalizes-Acquisition-of-STAHLAGRUBER-GmbH.html>.
- Marguerite Reardon and Shara Tibken, “The Beats Go On at HP (at Least Until 2015),” *CNET*, May 28, 2014, available at <https://www.cnet.com/tech/computing/the-beats-go-on-at-hp-at-least-until-2015>.
- Mark Tyson, “Nuvia ‘clean-sheet CPU design’ performance previewed,” *Hexus*, August 11, 2020, available at <https://hexus.net/tech/news/cpu/144733-nuvia-clean-sheet-cpu-design-performance-previewed/>.
- Matt Brian, “Tesco Has Given Up on Blinkbox,” *AOL*, July 19, 2019, available at <https://www.aol.com/news/2015-01-26-tesco-gives-up-on-blinkbox.html>.
- Meribah Knight, “LKQ Acquires Netherlands Auto Parts Distributor for \$268 Million,” *Crain’s Chicago Business*, April 25, 2013, available at <https://www.chicagobusiness.com/article/20130425/NEWS05/130429834/lkq-acquires-netherlands-auto-parts-distributor>.
- Michelle Castillo, “Disney Will Pull Its Movies from Netflix and Start Its Own Streaming Services,” *CNBC*, August 8, 2017, available at <https://www.cnbc.com/2017/08/08/disney-will-pull-its-movies-from-netflix-and-start-its-own-streaming-services.html>.
- Michelle Deakin, “Designing the Deal,” *Harvard Law Bulletin*, September 1, 2005, available at <https://hls.harvard.edu/today/designing-the-deal>.
- Natalie Robehmed, “Disney to End Distribution Agreement with Netflix, Launch Streaming Service,” *Forbes*, August 8, 2017, available at <https://www.forbes.com/sites/natalierobehmed/2017/08/08/disney-to-end-distribution-agreement-with-netflix-as-it-prepares-own-streaming-service/?sh=7486af462a98>.
- “Past Pileggi Lecture Keynote Speakers,” *Delaware Journal of Corporate Law*, available at <https://djcl.org/home-2-2-2-2/>.
- Paul Ziobro, “Target Won’t Renew U.S. License for Cherokee Brand,” *The Wall Street Journal*, September 10, 2015, available at <https://www.wsj.com/articles/target-wont-renew-u-s-license-for-cherokee-brand-1441919400>.
- “PON Global,” *Harvard Law School*, May 20, 2022, available at <https://web.archive.org/web/20220520141129/https://www.pon.harvard.edu/category/pon-global>.
- “Put Agreement entered into by and between Ermenegildo Zegna Holditalia S.p.A. and Thom Browne,” August 25, 2018, available at

- <https://www.sec.gov/Archives/edgar/data/1877787/000119312521259464/d198909dex1011.htm>.
- Qualcomm Press Release, “Qualcomm to Acquire Nuvia,” January 12, 2021, available at <https://www.qualcomm.com/news/releases/2021/01/qualcomm-acquire-nuvia>.
 - “Shareholder Agreement among Signing Day Sports, Inc. and each of the stockholders of Signing Day Sports, Inc.,” May 17, 2022, available at https://www.sec.gov/Archives/edgar/data/1898474/000121390023053645/ea181047ex10-1_signing.htm.
 - Soroush Pourhadi, “Adobe Licensing Guide,” *vScope*, August 12, 2019, available at <https://www.vscope.net/blog/adobe-licensing-guide>.
 - Stephen Reily, “Starbucks, Kraft and the \$2.7 Billion Divorce,” *IMC Licensing*, December 23, 2013, available at <https://imclicensing.com/starbucks-kraft-and-the-2-7-billion-divorce>.
 - “Stockholders Agreement By and Among The Azek Company Inc., Ares Corporate Opportunities Fund IV, L.P., and Ontario Teachers’ Pension Plan Board,” 2020, available at <https://www.sec.gov/Archives/edgar/data/1782754/000119312520028208/d776367dex42.htm>.
 - “Strategy Analytics: Headline: Qualcomm, Apple and MediaTek Dominate the Arm-based Mobile Computing Chip Market,” *Business Wire*, June 16, 2022, available at <https://www.businesswire.com/news/home/20220616005125/en/Strategy-Analytics-Headline%20A0Qualcomm-Apple-and-MediaTek-Dominate-the-Arm-based-Mobile-Computing-Chip-Market>.
 - “Termination Clauses,” *LexisNexis*, available at <https://www.lexisnexis.com/supp/largelaw/no-index/coronavirus/commercial-transactions/commercial-transactions-termination-clauses.pdf>.
 - “Tesco’s Blinkbox Starts Carrying Disney Movies,” *Washington Times*, April 4, 2012, available at <https://www.washingtontimes.com/news/2012/apr/4/tescos-blinkbox-starts-carrying-disney-movies>.
 - “The ARM processor business model,” *Arm*, available at <https://developer.arm.com/documentation/dht0001/a/architectures--processors--and-devices/the-arm-processor-business-model>.
 - “Welcome to the Program on Negotiation (PON),” *Harvard Law School*, available at <https://www.pon.harvard.edu/about>.
 - “What is Negotiation Theory?” *Harvard Law School*, available at <https://www.pon.harvard.edu/tag/negotiation-theory>.

Note: In addition to the materials on the above list, I considered all materials cited in my report as well as all materials cited or referenced in Professor Subramanian’s report to form my opinions.

Exhibit 11

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

ARM LTD.,

Plaintiff,

v.

QUALCOMM INC., QUALCOMM
TECHNOLOGIES, INC. and NUVIA, INC.,

Defendants.

C.A. No. 22-1146 (MN)

EXPERT REBUTTAL REPORT OF JOEL H. STECKEL, PH.D.

February 27, 2024

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I. INTRODUCTION

A. Qualifications

1. I am a Professor of Marketing at the Leonard N. Stern School of Business, New York University (“NYU Stern”), where I have taught since January 1989. I served as NYU Stern’s Vice-Dean for Doctoral Education from August 2012 to September 2021. Overlapping that interval, I also served as the Acting Chairperson of the school’s Accounting Department from August 2016 to August 2019. Prior to my promotion to Vice Dean, I was the faculty director of the Stern School Doctoral Program for five years, from May 2007 to July 2012. Earlier I served as the Chairperson of NYU Stern’s Marketing Department for six years, from July 1998 to June 2004. I have also held either permanent or visiting faculty appointments at the Graduate School of Business, Columbia University; the Anderson Graduate School of Management, U.C.L.A.; the School of Management, Yale University; and the Wharton School, University of Pennsylvania. This past academic year (2022-2023) I was on sabbatical and served as a Visiting Scholar at the University of Pennsylvania Carey Law School.
2. I received my B.A. *summa cum laude* from Columbia University in 1977, and M.B.A. (with distinction), M.A., and Ph.D. degrees from the Wharton School, University of Pennsylvania in 1979, 1980, and 1982, respectively. I was elected to *Phi Beta Kappa* at Columbia University and *Beta Gamma Sigma* at the Wharton School. These are the national honor societies for the respective disciplines I studied at these institutions.
3. I was the Founding President of the INFORMS (Institute for Operations Research and Management Science) Society on Marketing Science (“ISMS”), the foremost professional group for the development and application of management science theory and tools in

marketing. In addition, I am a member of the American Marketing Association, the American Statistical Association, the Association for Consumer Research, the American Psychological Association, the American Association for Public Opinion Research, and the Society for Consumer Psychology.

4. My fields of specialization within marketing include marketing research methodologies such as marketing and branding strategies, the relationship between marketing research and marketing strategy, managerial decision-making, consumer decision-making, and the study of consumer perceptions of trademarks. I am an author or editor of five books and over 60 articles. In the course of my scholarly research, teaching, and consulting work, I have studied issues of marketing research, branding, and their roles in consumer choice and marketing strategy. In particular, I have studied methodologies for assessing consumer perceptions of trademarks.
5. I have sat on the editorial boards of many major journals over the years. From July 2010 until March 2017, I served as a co-Editor-in-Chief of the journal *Marketing Letters*. In that capacity, I evaluated over 200 research studies each year for over six and a half years. I served as a gatekeeper, deciding which articles were published in the journal, and which were not. As such, my evaluations of the scientific reliability and validity of each research study were subject to the scrutiny of the academic community. The community considers any study that appeared in the journal that did not conform to the scientific standards of my profession as a black mark on my record. I consider the fact that the journal's publisher, the international firm, Springer-Verlag, kept me on long past the expiration of my term (July 2014) as validation of my performance in evaluating scientific research. My

professional qualifications are described further in my curriculum vitae, which is attached as **Appendix A**.

6. During the course of my professional career, I have designed, conducted, supervised, and/or evaluated hundreds of consumer surveys. In that work, I have formulated sampling strategies, designed questionnaires, analyzed data, and interpreted results. I have also evaluated similarly purposed survey work performed by others.
7. I have served as an expert witness on marketing research, marketing strategy, branding, trademark, and issues related to consumer decision-making in a variety of litigation matters. In the past four years, I testified as an expert witness in the matters listed in **Appendix B**.
8. My rate of compensation for this assignment is \$1,250 per hour. Others at Analysis Group, Inc. (“AG”), an economic and litigation consulting firm headquartered in Boston, Massachusetts, performed part of the work for this assignment under my direction. I receive additional compensation from AG related to the work of others under my supervision. No compensation is contingent upon the outcome of this research or of the case.

B. Case Background

9. Plaintiff Arm Ltd. (“Arm” or “Plaintiff”) “develop[s] processor architectures, including instruction set architectures, and processor core designs implementing those architectures.”¹ According to the Complaint, Arm “does not manufacture or sell chips,” but rather licenses its chip technology to other companies “to use in developing their own

¹ Complaint, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, Case No.: 1:22-cv-01146-UNA, United States District Court for the District of Delaware, August 31, 2022 (“Complaint”), ¶ 11.

chips or in their own electronic devices.”² Arm “monetize[s] its research and intellectual property by receiving both licensing fees and royalties for products incorporating Arm’s technology and intellectual property.”³ I understand from the Complaint that, according to Arm, “there are two main types of Arm licenses for Arm’s technologies: Technology License Agreements (‘TLAs’), which allow the use of specific ‘off-the-shelf’ Arm processor core designs with only minor modifications, and Architecture License Agreements (‘ALAs’), which allow for the design of custom processor cores that are based on particular architectures provided by Arm.”⁴ I understand that Arm-built cores are licensed under TLAs and Qualcomm custom cores are licensed under ALAs.

10. Defendants are Qualcomm, Inc. and Qualcomm Technologies, Inc. (collectively, “Qualcomm”) and NuVia, Inc. (“Nuvia”), together “Defendants.” According to the Complaint, “Qualcomm is one of the world’s largest semiconductor companies, with a portfolio of intellectual property and products directed to wireless technologies, including cellular, Bluetooth, and Wi-Fi; CPUs and ICs; networking; mobile computers; cell phones; wearables; cameras; automobiles; and other electronic devices.”⁵ Nuvia was a startup founded in 2019 that “planned to design energy-efficient CPUs for data center servers based on a custom processor implementing the Arm architecture.”⁶

² Complaint, ¶ 14.

³ Complaint, ¶ 16.

⁴ Complaint, ¶ 17.

⁵ Complaint, ¶ 25.

⁶ Complaint, ¶ 20.

11. I understand that Arm granted Nuvia both an ALA and TLA in 2019,⁷ and through 2021 Nuvia designed custom processor cores.⁸ [REDACTED]

[REDACTED]
[REDACTED] [REDACTED]
[REDACTED]
[REDACTED] [REDACTED]
[REDACTED]

12. I further understand that Qualcomm also has an Arm ALA and TLA.¹² [REDACTED]

[REDACTED]
[REDACTED] [REDACTED]
[REDACTED] [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] [REDACTED]

⁷ Complaint, ¶ 21.

⁸ Complaint, ¶ 23.

⁹ QCARM_0337839–855 at 843.

¹⁰ ARM_00111099–113 at 103.

¹¹ QCARM_0337839–855 at 843; ARM_00111099–113 at 103.

¹² Complaint, ¶¶ 26-27.

¹³ ARM_00055357–399 at 363.

¹⁴ ARM_00060458–512 at 462. [REDACTED]
[REDACTED]

¹⁵ ARM_00055357–399 at 363; ARM_00060458–512 at 462.

13. Qualcomm announced on January 13, 2021 that it was acquiring Nuvia,¹⁶ and ultimately completed the acquisition in March 2021.¹⁷ According to the Defendants’ Amended Answer to Plaintiff’s Complaint, after the Nuvia acquisition, under its own agreements with Arm, Qualcomm continued work that Nuvia had started on its custom core and a “system on a chip” (SoC) for the server market.¹⁸ I understand from the Defendants’ Amended Answer that Qualcomm’s work on that technology carried on for about a year without disruption.¹⁹ Plaintiff asserts that, in a January 2022 press release, Qualcomm “tout[ed] the ‘broad support from ecosystem partners for the PC industry’s transition to Arm®-based computing,’ with Qualcomm’s CEO confirming that ‘[t]he future of the PC industry is modern Arm-based architectures.’”²⁰
14. According to the Complaint, Arm terminated both Nuvia licenses effective March 1, 2022, and reminded Qualcomm and Nuvia “of their obligations upon termination to stop using and destroy the Nuvia technology developed under the now-terminated licenses.”²¹ I understand that Qualcomm disputes that it was obligated to stop using and destroy any

¹⁶ Complaint, ¶ 28.

¹⁷ “Qualcomm Completes Acquisition of Nuvia,” *Qualcomm*, March 15, 2021, available at <https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia>.

¹⁸ Defendants’ Answer and Defenses to Plaintiff’s Complaint and Jury Demand and Defendants’ Amended Counterclaim, *Arm Ltd. V. Qualcomm Inc., Qualcomm Technologies, Inc. and NuVia, Inc.*, Case No. 22-1146 (MN), United States District Court for the District of Delaware, October 26, 2022 (“Defendants’ Amended Answer”), ¶ 30 (“Meanwhile, throughout 2021 to the present day and with full knowledge by ARM, Qualcomm continued development work on the [REDACTED] as was its right under Qualcomm’s own license agreements with ARM.”).

¹⁹ Defendants’ Amended Answer, ¶ 240 (“Despite ARM’s demand that Qualcomm destroy and stop using NUVIA technology, for approximately one year, ARM continued to provide verification support to Qualcomm in developing the [REDACTED] and related SoCs, and also continued to acknowledge the Defendants’ rights under the Qualcomm ALA and TLA to that technology.”).

²⁰ Complaint, ¶ 38.

²¹ Complaint, ¶ 39.

technology as a result of this demand, but that it carried out a process to fulfill Arm’s request and certified that it had done so.²²

15. Plaintiff alleges that after the termination, “based on Qualcomm’s public announcements of its plans to use Nuvia technology,” Qualcomm “likely [...] has continued to retain and use Nuvia technology developed pursuant to the Nuvia licenses, thereby materially breaching the termination provisions of those licenses.”²³
16. Plaintiff alleges that “[t]he failure of Nuvia and Qualcomm to comply with the post-termination obligations under the Nuvia ALA is causing, and will continue to cause, irreparable harm to Arm.”²⁴ Plaintiff further alleges that “Qualcomm and Nuvia’s unauthorized use of the ARM Marks [...] is likely to cause confusion, mistake, or deception on the part of consumers as to the affiliation, connection, or associations of Defendants with Arm, or as to the origin, sponsorship, or approval of Defendants’ semiconductor chips using the relevant Nuvia technology.”²⁵
17. I understand that Qualcomm contends that the ALA “is intended to encourage licensees to develop their own CPU core technology with their own innovations, at their own risk and expense and for their benefit,”²⁶ and that “Qualcomm can, under the ALA, design, manufacture, and distribute Qualcomm’s custom ARM-compatible CPU cores.”²⁷

²² Defendants’ Amended Answer, ¶¶ 36-37.

²³ Complaint, ¶ 52.

²⁴ Complaint, ¶ 54.

²⁵ Complaint, ¶ 77.

²⁶ Defendants’ Amended Answer, ¶ 43.

²⁷ Defendants’ Amended Answer, ¶ 183.

C. The Dhar Report’s Opinions

18. Plaintiff retained Dr. Ravi Dhar, Ph.D., “to opine, from a marketing and consumer behavior perspective, on the following issues:
- a. [t]he benefit of a strong mark in the marketplace;
 - b. [w]hether Arm’s Trademarks and brand are distinctive and strong in the United States marketplace context;
 - c. [w]hether Qualcomm’s unlicensed use of the Arm Trademarks in connection with ‘Nuvia Products’ [...] would likely result in confusion [...]; [and]
 - d. [w]hether Qualcomm’s use of the Arm Trademarks is likely to cause harm by impacting the brand or result in a loss of sales by Arm and Arm’s licensees that serve the same market.”²⁸
19. To address this assignment, Dr. Dhar states that he “reviewed case specific materials provided to [him] by counsel, as well as other documents”²⁹ and “drew on [his] knowledge, education, and experience in marketing and branding developed over the past several decades” in forming his opinions.³⁰ Based on those materials and background, Dr. Dhar concluded that:
- a. “Arm’s brand and Trademarks are strong and confer value in the marketplace;”

²⁸ Expert Report of Ravi Dhar Regarding Trademark Infringement, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, December 20, 2022 (“Dhar Report”), ¶ 9.a-d.

²⁹ Dhar Report, ¶ 12.

³⁰ Dhar Report, ¶ 12.

- b. “Qualcomm’s prior history and usage of Arm’s Trademarks [...] demonstrate a high likelihood that Qualcomm will continue to use Arm’s Trademarks in connection with its future products, particularly Nuvia Products;”
- c. “Qualcomm’s use of Arm’s Trademarks is likely to cause customer confusion;” and
- d. Qualcomm’s “unauthorized use is [...] likely to cause harm to Arm” via “loss of control to Arm of its brand and goodwill” and “divert[ing] customers away from Arm.”³¹

D. Assignment

- 20. I was asked by Paul, Weiss, Rifkind, Wharton, & Garrison LLP, Counsel for Qualcomm, to review and assess the Expert Report of Ravi Dhar (the “Dhar Report”). Specifically, I was asked to assess the validity of the conclusions offered in the Dhar Report in light of the evidence Dr. Dhar presented.
- 21. In formulating my opinions, I have considered the Dhar Report, materials considered by Dr. Dhar, and the materials cited in the footnotes of this rebuttal report and listed in **Appendix C**. Should additional relevant documents or information be made available to me, I may amend or supplement my opinions as appropriate.

II. SUMMARY OF CONCLUSIONS

- 22. Based on my review of the Dhar Report and other case materials, I conclude the following:
- 23. The Dhar Report does not meet the standards for a rigorous scientific analysis under accepted industry practices and academic guidelines. The opinions in the Dhar Report are not based on sufficient facts or data. In particular, the selection of sources in the Dhar

³¹ Dhar Report, ¶¶ 13-16.

Report appears to be skewed by only considering favorable tidbits in the record, without considering contrary or more holistic evidence. Further, in drawing his conclusions, Dr. Dhar has conducted no research of his own and has not cited any evidence that describes the results of any customer-based research or application. Therefore, the opinions in the Dhar Report amount to little more than subjective personal views about how Dr. Dhar believes the Arm brand may be perceived or whether the use of the Arm Trademarks might cause confusion. Because Dr. Dhar does not apply any replicable methodology beyond his simple say-so to the facts that can be studied, his opinions do not pass scientific muster. See **Section III**.

24. The Dhar Report's assessment of the purported strength of the Arm brand is incomplete and cannot be relied upon.
 - a. The Dhar Report fails to provide any customer-based evidence of brand awareness or brand associations. The Dhar Report's evaluation of Arm's brand strength reflects the goals of Arm's branding efforts, but does not examine the extent to which those branding efforts are successful. Such an evaluation would require customer-based evidence. The sources cited in the Dhar Report do not shed light on what actual or potential purchasers of Arm's intellectual property understand the Arm brand to mean. See **Section IV.A**.
 - b. The Dhar Report claims that the Arm brand serves as a strong ingredient brand without offering any rigorous assessment. The Dhar Report does not apply to his analysis of Arm's brand any established marketing knowledge or literature about what constitutes a successful ingredient brand. Without any customer-based analysis or application of established marketing knowledge to assess the success of an ingredient brand, the Dhar

Report cannot establish that the Arm brand is a strong ingredient brand in either Arm’s business-to-business (“B2B”) market or, ultimately, in end consumers’ decisions to purchase an Arm-based end product. See **Section IV.B.**

- c. The Dhar Report fails to take into consideration Qualcomm’s own brand and brand strength in its relationship to Arm. The Dhar Report’s implication that Arm’s brand is an ingredient in the overall success of end products among downstream consumers is unsupported and fails to consider the potentially significant role of other brands and brand components, including Qualcomm’s, in these end products’ marketing or commercial success. See **Section IV.C.**

25. The Dhar Report’s assertion that Qualcomm’s use of the Arm Trademarks is likely to cause confusion is baseless.

- a. The Dhar Report inappropriately points to Qualcomm’s historical uses of the Arm Trademarks to assume that Qualcomm will likely use the Arm Trademarks in the same way in the future. In particular, the Dhar Report’s conclusion that Qualcomm’s use of the Arm Trademarks is likely to create confusion is based on the Dhar Report’s analysis of Qualcomm’s prior use of the Arm Trademarks in connection with Arm-built central processing unit (“CPU”) cores, rather than Qualcomm’s custom-designed cores that are compatible with the Arm instruction set architecture (the “Arm ISA”). The Dhar Report ignores that Qualcomm’s current uses of the Arm Trademarks are distinguished from the Dhar Report’s citations of Qualcomm’s historical uses of the Arm Trademarks in that they incorporate a modifier like “-based,” “-compliant,” or “-compatible” and are used in factually accurate statements about Qualcomm’s products — not as a branding description of the product itself. See **Section V.A.**

- b. The Dhar Report’s conclusions regarding confusion are flawed because the Dhar Report fails to consider the sophistication of the B2B industrial procurement departments that purchase Qualcomm’s chips, which are highly trained and may therefore be unlikely to be confused by uses of the Arm Trademarks to describe Qualcomm custom cores’ technical attributes. Furthermore, the Dhar Report’s failure to conduct an empirical analysis of customer confusion, particularly within the relevant market of purchasers, highlights the lack of concrete support for its conclusions. See **Section V.B.**
 - c. The Dhar Report’s assertion that Qualcomm’s purported use of the Arm Trademarks creates a false understanding of the custom cores’ affiliation, sponsorship, or certification is also unsupported. The Dhar Report offers no empirical analysis to determine whether use of terms such as “Arm-based” or “Arm-compliant” generally connotes any affiliation, sponsorship, approval, validation, or otherwise certification by Arm. The Dhar Report does not present any scientific research necessary to support its conclusion that Qualcomm’s purported use of the Arm Trademarks have led to any consumer confusion. See **Section V.C.**
 - d. The Dhar Report presents no evidence of any actual confusion caused by Qualcomm’s purported use of the Arm Trademarks, and the report overlooks admissions by Arm and testimony from Arm’s corporate deponents that indicate that Arm itself has been unaware of any actual confusion. See **Section V.D.**
26. The Dhar Report’s conclusions on harm to the Arm brand are speculative and do not explain the mechanism by which harm would occur.

- a. The Dhar Report’s conclusion about harm to the Arm brand’s image and goodwill is speculative and unsupported. Beyond generic unsupported statements that merely explain the general concept of loss of brand image and goodwill, the Dhar Report does not precisely define or otherwise specify what that harm is and how that harm would occur in this specific context. Moreover, the Dhar Report ignores evidence that suggests the opposite, that the Arm brand has not been and is unlikely to be harmed. See **Section VI.A.**
- b. The Dhar Report’s claim about purported harm to Arm through diversion of sales is overly simplistic, speculative, and unsupported. The Dhar Report does not provide any concrete description of how, or evidence of whether, customers would develop a “mistaken[] understand[ing]” in the sophisticated B2B market in which Qualcomm and other Arm licensees compete.³² Further, the Dhar Report also does not describe or provide evidence for whether or how this “mistaken[] understand[ing]” would itself cause sales to be diverted from authorized users of Arm Trademarks. See **Section VI.B.**
- c. The Dhar Report offers no evidence for its claim that Nuvia customers would be harmed as a result of Qualcomm’s use of Arm Trademarks. The Dhar Report fails to establish that potential purchasers of Nuvia products would be deceived about the nature or benefits of the chips they are purchasing, including whether Arm has a license with Qualcomm. See **Section VI.C.**

³² Dhar Report, ¶ 132 (“Customers who might have sought out an Arm product may instead turn to Qualcomm’s products because they mistakenly understand, because of Qualcomm’s infringing use of Arm Trademarks, that Qualcomm’s Nuvia Products are equivalent to Arm technology, or somehow supported by Arm.”).

27. The Dhar Report’s analysis of fair use attempts to substitute trademark knowledge for the judgment of a court. In addition, the Dhar Report’s analysis of fair use is speculative and incomplete. The Dhar Report consistently overlooks and ignores that Qualcomm uses the Arm Trademarks in connection with its custom cores *referentially* to describe its products’ technical attributes. The Dhar Report does not offer any evidence that Qualcomm’s descriptions of the custom cores as “Arm-based,” “Arm-compliant,” or “Arm-compatible” are factually inaccurate, nor does it offer any evidence that relevant customers would take away an inaccurate understanding of the relationship between Qualcomm and Arm from those terms. The Dhar Report fails to consider whether Qualcomm’s descriptions of its custom cores as “Arm-based,” “Arm-compliant,” or “Arm-compatible” are necessary to accurately identify the custom cores’ technical attributes, whether it uses the Arm mark only to the degree necessary to do that, and that it describes that the custom cores are compatible with the Arm ISA, which I understand to be accurate. See **Section VII**.
28. I reserve the right to amend or supplement my opinions, if appropriate, based on additional information I may receive in the future or additional opinions that Arm’s experts may present.

III. THE DHAR REPORT DOES NOT MEET THE STANDARDS FOR A RIGOROUS SCIENTIFIC ANALYSIS UNDER ACCEPTED INDUSTRY PRACTICES

29. It is well-established in the field of marketing research that research must be supported with objective facts and a scientific research process, which is a “systematic, controlled,

empirical, amoral, public, and critical investigation of natural phenomena.”³³ Reasoning without controlled observation and measurement does not constitute science; rather, if a scientist has a hypothesis, it must be tested with an approach that presents “careful logic, organized observation, and measurement that is open to independent scrutiny by others.”³⁴ Thus, one of the cornerstones of scientific research, including marketing research pertaining to branding, is the replicability of a methodology such that the final opinion could be put to an independent test.

30. As a rebuttal expert, I should be able to investigate and reproduce every step of the analysis an expert performed to derive the conclusions they have reached and the opinions they have put forward. In this case, I should be able to completely examine the way in which the Dhar Report reached its conclusions.
31. However, the Dhar Report has neither applied nor described any replicable analysis or methods from which it draws the conclusions in the report. Even when only considering the documents Dr. Dhar reviewed, based on the information presented in the Dhar Report, it is not clear how he selected the documents he reviewed, the process by which he reviewed them, and how precisely these reviews informed his conclusions. Further, the Dhar Report states that, in reaching its conclusions, Dr. Dhar leveraged his “knowledge and experience, well-established principles of branding, [his] analysis of documents and testimony provided to [him] by counsel and cited herein, and [his] own independent research.”³⁵

³³ Kerlinger, F.N., and H.B. Lee, *Foundations of Behavioral Research*, Fourth Edition, Cengage Learning, 2000, at p. 14.

³⁴ Rosnow, Ralph L. and Robert Rosenthal, *Beginning Behavioral Research*, Seventh Edition, Pearson, 2012, p. 17.

³⁵ Dhar Report, ¶¶ 12-13.

However, the Dhar Report does not provide any way to understand how Dr. Dhar applied that knowledge and experience to the relevant facts; nor does it describe what that “independent research” entailed and how it was conducted. Overall, based on my review of the Dhar Report, none of the opinions presented are supported by the results of a replicable scientific process. I discuss three specific flaws below.

32. *First*, the opinions in the Dhar Report are not based on sufficient facts or data. In particular, the selection of sources in the Dhar Report appears to be skewed by only considering favorable evidence in the record (e.g., testimony by Arm’s own representatives) without considering contrary evidence, even from the same documents.³⁶ I discuss such instances throughout the report. Some examples include the following:

a. The Dhar Report states that Arm’s customers “develop and innovate with Arm’s support” and that Arm invests significant efforts in the “design and verification” of its customers processors.³⁷ This statement, however, relies solely on Arm’s 2023 424(b)(4) SEC filing and is belied by — among other things — an article the Dhar Report cites in the very next paragraph.³⁸

³⁶ See Meyer, M.A., and J.M. Booker, *Eliciting and Analyzing Expert Judgment: A Practical Guide*, SIAM & ASA, 2001, Chapter 3.

³⁷ Dhar Report, ¶ 40, citing Arm SEC Form 424(b)(4), September 13, 2023, available at https://www.sec.gov/Archives/edgar/data/1973239/000119312523235320/d550931d424b4.htm#rom550931_7.

³⁸ See Dhar Report, FN 30, citing Shimpi, Anand L., “The ARM Diaries, Part 1: How ARM’s Business Model Works,” *AnandTech*, June 28, 2013, available at <https://www.anandtech.com/show/7112/the-arm-diaries-part-1-how-arms-business-model-works> (“Here [under an ALA] you basically get a book and a bunch of tests to verify compliance with the ARM ISA you’re implementing. ARM will offer some support to help you with your design, but it’s ultimately up to you to design, implement and validate your own microprocessor design.”).

- b. The Dhar Report relies on a deposition quote from Jonathan Armstrong, Arm’s Head of Brand and Creative Services, to state that third parties are required to contact “Arm’s Trademarks team every time it would like to use Arm’s word trademarks in connection with a reference to Arm’s products, services, or related technologies.”³⁹ This statement, however, is patently incorrect: Arm’s Trademark Use Guidelines authorize use of Arm’s word marks without prior approval or licensing so long as the use is “accurate, fair and not misleading.”⁴⁰
- c. The Dhar Report’s claim that “Arm’s innovation is responsive to consumer demands” is sourced from Arm’s 2023 SEC F-1 filing and public statements from Will Abbey, Arm’s Chief Commercial Officer, published in *TechCrunch*.⁴¹ Additionally, Arm’s December 2021 submission to U.K. regulators at the Competition and Markets Authority shows that the company believed that it was *not* well-positioned to meet these demands.⁴²
- d. Similarly, the only outside evidence in the Dhar Report’s section that supports his conclusions that there has been harm to Arm is deposition testimony again from Mr.

³⁹ Dhar Report, ¶ 56, citing Deposition of Jonathan Armstrong, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146, United States District Court for the District of Delaware, December 8, 2023 (“Armstrong Deposition”), p. 126:11-20.

⁴⁰ QCARM_7517739–744 at 739 (“You may use Arm’s trademarks, product names, service names, technology names and other names in text to refer to Arm’s products, services and related technology if you follow these guidelines and your use is accurate, fair, and not misleading.”).

⁴¹ Dhar Report, ¶ 104, citing ARM_01259705–0105 at 9715 and Lardinois, Frederic, “Arm After the IPO,” *TechCrunch*, September 14, 2023, available at <https://techcrunch.com/2023/09/14/arm-after-the-ipo>.

⁴² ARM_00088656–684 at 658 (“In addition, Arm does not have the systems building expertise, the software engineering scale, or the R&D resources of x86 vendors like Intel and AMD. Even under the most optimistic projections, standalone Arm could not generate the revenue necessary to invest and compete toe-to-toe with the entrenched x86 incumbents.”).

Abbey.⁴³ Dr. Dhar fails to consider evidence that Arm has *not* been harmed, including in testimony to that effect from Jonathan Armstrong, Arm’s Head of Brand and Creative Services,⁴⁴ and from Mr. Abbey himself,⁴⁵ in addition to evidence of Arm’s ample financial success despite Qualcomm’s allegedly harmful use of Arm’s trademarks.⁴⁶

33. The Dhar Report’s reliance on this evidence, without considering or evaluating contrary evidence that might undermine these statements, makes its assessment of sources highly one-sided.
34. *Second*, the Dhar Report does not set out any methodology that underpins the basis of his opinions, therefore rendering Dr. Dhar’s opinions not scientifically reliable. As noted

⁴³ See Dhar Report, Section VIII.D; Dhar Report, ¶¶ 129-130.

⁴⁴ Armstrong Deposition, p. 118:11-23 (“Q. Okay. As your – in your capacity as corporate designee, are you aware of any Arm partners or customers telling Arm that they value Arm’s trademarks differently as a result of Qualcomm’s use of Arm’s word mark? A. No, not aware. Q. In your role as Arm’s corporate designee, are you aware of any Arm customers or licensees taking the view that they do not need to follow Arm’s Trademark Use Guidelines or Branding Guidelines because of Qualcomm’s actions in connection with this lawsuit? A. No.”).

⁴⁵ See Deposition of Will Abbey, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146 (MN), United States District Court for the District of Delaware, October 27, 2023 (“Abbey Deposition”), pp. 365:17-367:17.

⁴⁶ See “FYE24-Q3 Shareholder Letter,” *Arm Holdings plc*, February 7, 2024, available at <https://investors.arm.com/static-files/4404a89a-d033-419e-aa0f-d7b15d40e11f>, p. 2 (“We had an outstanding Q3 delivering record revenues... Growth was driven by both royalty revenue and license revenue.”); Motley Fool Transcribing, “Arm Holdings (ARM) Q3 2024 Earnings Call Transcript,” *The Motley Fool*, February 7, 2024, available at <https://www.fool.com/earnings/call-transcripts/2024/02/07/arm-holdings-arm-q3-2024-earnings-call-transcript/> (“Record revenues, we exceeded the high end of the range for the guidance and extremely pleased about results overall... Additionally, we are expecting another strong quarter for licensing with revenue up sequentially to near record levels.”). “FYE24-Q2 Shareholder Letter,” *Arm Holdings plc*, November 8, 2023, available at <https://investors.arm.com/static-files/bf24c7a3-d2c0-47bd-bf72-73f686a5d62f>, p. 2 (“The better than expected revenue was driven by multiple high-value long-term license agreements signed with industry leading technology companies, and royalty revenue benefiting from market share gains and higher royalty rates.”). Further, on an annual basis, Arm’s licensing revenue and profits have increased since Qualcomm acquired Nuvia in March 2021. “FYE24-Q2_ArmHoldingsPlc_Historical_Quarters_Datasheet.xlsx,” *Arm Holdings plc*, available at <https://investors.arm.com/static-files/4de417b7-2ea6-4f60-a1ce-13477d3b28b3>, accessed on February 20, 2024.

above, the Dhar Report states that Dr. Dhar conducted “independent research,” but does not describe the basis for that research, its purpose, its methodology, or even its results.

35. For the kinds of opinions presented in the Dhar Report, I would have expected Dr. Dhar (or his team) to conduct or otherwise rely upon customer-based evidence and research, for which many research methods are well-established in the academic literature. For example, an introductory textbook on strategic brand management describes many qualitative research techniques (e.g., free association, adjective ratings, personification exercises) and quantitative techniques (e.g., direct and indirect measures of brand recognition, aided and unaided measures of brand recall, scale measures of brand attributes and benefits) to assess potential brand associations and the depth of customers’ brand awareness.⁴⁷ To assess the value of brands or ingredient brands, the marketing literature describes numerous methods to assess brand equity, brand loyalty, brand trust, brand awareness, recognized quality, and brand associations.⁴⁸ To measure the success of an ingredient brand in B2B transactions, academic literature suggests the use of a “financially oriented measurement tool based on price premiums” such as conjoint analysis as an input.⁴⁹ In drawing his conclusions, Dr. Dhar has conducted no such research of his own and has not cited any evidence that describes the results of such customer-based research or applications.

36. *Third*, as Dr. Dhar has not applied any rigorous methodology to how his facts were selected or any empirical customer-based analysis to reach his opinions, the opinions in the Dhar

⁴⁷ See Keller, Kevin L., and Vanitha Swaminathan, *Strategic Brand Management: Building, Measuring, and Managing Brand Equity*, Fifth Edition, Pearson, 2020 (“Keller and Swaminathan (2020)”), pp. 332-366.

⁴⁸ See Kotler, Philip, and Waldemar Pfoertsch, *Ingredient Branding: Making the Invisible Visible*, Springer, 2010 (“Kotler and Pfoertsch (2010)”), pp. 310-314.

⁴⁹ Kotler and Pfoertsch (2010), p. 319.

Report amount to little more than subjective personal views about how Dr. Dhar believes the Arm brand might be perceived or whether the use of the Arm Trademarks might cause confusion. In other words, Dr. Dhar is asking us to accept his opinions simply because he says so.

IV. THE DHAR REPORT OFFERS NO VALID SUPPORT IN ITS ASSESSMENT OF THE ARM BRAND AND ITS ASSESSMENT OF THE RELATIONSHIP BETWEEN THE ARM AND QUALCOMM BRANDS

37. The Dhar Report looks at the Arm brand from two perspectives. First, it discusses the Arm brand as seen by its direct B2B customers (e.g. chip makers, electronics manufacturers).⁵⁰ Second, the report also refers to the brand as an ingredient brand (i.e., a brand whose inclusion as a component of another brand makes the later more attractive to downstream or end customers).⁵¹ In this section, I examine the Dhar Report’s discussion of the Arm brand from both perspectives.
38. The Dhar Report’s assessment of the purported strength of the Arm brand is incomplete and cannot be relied upon. The Dhar Report asserts that Arm “has a strong and distinctive B2B brand” without credible support.⁵² Namely, the Dhar Report: (i) fails to provide any customer-based evidence of brand awareness or brand association; (ii) claims that the Arm brand serves as a strong ingredient brand without offering any rigorous assessment; and (iii) fails to take into consideration Qualcomm’s own brand and brand strength in its relationship to Arm.

⁵⁰ See, e.g., Dhar Report, ¶¶ 93-106.

⁵¹ Dhar Report, ¶ 105.

⁵² Dhar Report, Section VIII.B.

A. The Dhar Report Claims That Arm’s Brand Is Strong Without Providing Evidence of Customers’ Impressions of the Arm Brand

39. As the Dhar Report (correctly) argues, strong brands are rooted in consumer memory. The knowledge of a brand stored in consumer memory “can be characterized in terms of two components: brand awareness and brand image.

- **Brand awareness** is related to the strength of the brand in memory, as reflected by consumers’ ability to identify the brand under different conditions.
- **Brand image** is perceptions about a brand as reflected by the brand associations held in consumer memory.”⁵³

Strong brands have both strong awareness (or identification of the mark) with particular goods and/or services and a strong brand image in memory by having strong, favorable, and unique brand associations.⁵⁴

40. Such a characterization of brands and brand strength requires that any rigorous, scientifically valid assessment of brand strength must be based on what consumers hold in memory. In other words, the assessment must rest on customer-based analyses of brand awareness and brand associations. Such evidence of potential sources of brand equity may include results from qualitative and quantitative market research methods, such as customer

⁵³ Dhar Report, ¶ 87.

⁵⁴ Dhar Report, ¶ 87-90. *See also, e.g.,* Kotler, Philip, and Kevin L. Keller, *Marketing Management*, Fifteenth Edition, Pearson, 2016 (“Kotler and Keller (2016)”), pp. 301-302 (“**Branding** is the process of endowing products and services with the power of a brand. It’s all about creating differences between products. Marketers need to teach consumers ‘who’ the product is—by giving it a name and other brand elements to identify it—as well as what the product does and why consumers should care. Branding creates mental structures that help consumers organize their knowledge about products and services in a way that clarifies their decision making and, in the process, provides value to the firm [...] **Brand equity** is the added value endowed to products and services with consumers. It may be reflected in the way consumers think, feel, and act with respect to the brand, as well as in the prices, market share, and profitability it commands.”).

surveys, brand recognition studies or ranking exercises, or brand association exercises.⁵⁵

Crucially, a brand analysis that concludes a brand is strong would only be scientifically valid if it includes some evidence of high awareness and positive brand associations among the customers for the brand being examined.

41. The Dhar Report, however, includes no such customer-based analysis of Arm’s brand strength. In fact, the Dhar Report section on Arm’s strength as a brand includes no evidence *at all* from Arm’s direct customers, let alone from Arm’s downstream customers.⁵⁶ In fact, outside of the Dhar Report’s citations to various trade awards won by Arm as a firm since 2010,⁵⁷ the only other sources the Dhar Report ties directly to claims about Arm’s purported brand strength are public testimony of a current Arm executive and Arm’s own 2023 Form F-1 company filing to the U.S. SEC.⁵⁸ These sources do not provide reliable evidence of relevant customers’ awareness of or associations with the Arm brand.
42. The lack of customer-based evidence is concerning given the Dhar Report’s emphasis on the fact that “Arm is a B2B brand” with large, well-known customers in the tech industry.⁵⁹ For example, despite stating that “Arm’s direct customers are chip developers and manufacturers, such as Amazon, Google, Intel, NVIDIA, and Samsung, rather than end

⁵⁵ Keller and Swaminathan (2020), pp. 332-366.

⁵⁶ See Dhar Report, Section VIII.

⁵⁷ See Dhar Report, ¶ 99.

⁵⁸ See Dhar Report, ¶¶ 97-106; ARM_01259705–0105; Lardinois, Frederic, “Arm After the IPO,” *TechCrunch*, September 14, 2023, available at <https://techcrunch.com/2023/09/14/arm-after-the-ipo/> (quoting Will Abbey, Arm’s Executive VP and Chief Commercial Officer).

⁵⁹ Dhar Report, ¶ 97.

customers,”⁶⁰ the Dhar Report draws no direct evidence from these customers in general or any individuals who occupy a variety of roles in such companies (each with numerous divisions and employees). The Dhar Report does not, for example, investigate how these market participants experience the Arm brand in any level of detail, separate and apart from the Dhar Report’s earlier, general overview of Arm’s licensing structure.⁶¹

43. Further, the Dhar Report ignores the crucial question of business-customer and end-consumer awareness. The Dhar Report presents various assertions toward Arm’s purported brand strength, such as “Arm offers benefits to downstream customers” or “Arm’s innovation is responsive to consumer demands,” without any context or further evidence collected from among the audience of relevant parties outside Arm for whom the Dhar Report claims these brand assets are perceived.⁶²

44. The Dhar Report’s lack of further evidence from outside Arm is noteworthy. For example, the Dhar Report states that “[a] strong brand like Arm arises from the thoughts, feelings, and associations that are linked to the Arm brand,”⁶³ yet does not provide any evidence of these brand associations. The Dhar Report’s failure to consider any outside evidence for its conclusions renders the conclusions suspect, particularly given the many well-established research methods available to assess the strength of a brand and customers’ associations

⁶⁰ Dhar Report, ¶ 97.

⁶¹ See Dhar Report, ¶¶ 32-47.

⁶² Dhar Report, ¶¶ 103-104. The only evidence offered for these points are statements from Arm’s own 2023 SEC F-1 filing.

⁶³ Dhar Report, ¶ 105.

with the brand.⁶⁴ It was not impossible for Dr. Dhar to have collected and reviewed such data in the process of preparing his report.

45. The non-customer evidence that the Dhar Report solely relies upon fails to fill the gap left by a lack of any business-customer and end-consumer evidence for Arm’s purported brand strength. For example, the Dhar Report cites recognition of Arm by the World Intellectual Property Organization, Arm’s sales and the prior year’s inventory of Arm-based chips, and awards won by Arm between 2010 and 2021 as evidence that “[t]he Arm Trademarks have been strong and distinctive marks for decades.”⁶⁵ In stating that these strands of evidence prove the Arm Trademarks’ strength and distinctiveness, the Dhar Report does not explain whether: (1) the direct B2B and/or the downstream end-consumer audiences of Arm’s brand are aware of any of this information; (2) whether awards won by Arm or the volume of sales of Arm-based products matter to these groups of customers, and if so, how; or even (3) whether Arm’s recognition by award-presenting entities was based on any underlying information that would be relevant to purchasers of Arm’s intellectual property. The Dhar Report’s failure to tie these strands of evidence to perceptions among Arm’s customers is critical, as the purported strength or distinctiveness of the Arm brand relies on consumer perceptions and not the evaluation criteria of various award-granting entities.⁶⁶ Were it the

⁶⁴ See, e.g., Keller and Swaminathan (2020), pp. 332-366. For example, an introductory textbook on strategic brand management describes many qualitative research techniques (e.g., free association, adjective ratings, personification exercises) and quantitative techniques (e.g., direct and indirect measures of brand recognition, aided and unaided measures of brand recall, scale measures of brand attributes and benefits) to assess possible brand associations and the depth of customers’ brand awareness. Keller and Swaminathan (2020), p. 360.

⁶⁵ Dhar Report, ¶ 99.

⁶⁶ Elsewhere, in its abstract discussion of brand strength, the Dhar Report recognizes that promotional efforts and media coverage surrounding the brand inform consumer impressions of the brand, yet the Dhar Report

case, for example, that any of these accolades do indeed inform business customers and end consumers’ brand perceptions of Arm, it would be Dr. Dhar’s responsibility as a researcher to draw out and demonstrate any such associations, instead of merely listing inventory figures and third-party recognitions of Arm and implying that they are of constituent importance to Arm’s brand strength amid a lack of direct, consumer-based evidence.

46. Instead, the Dhar Report’s attempted evaluation of Arm’s brand strength reflects merely the *goals* of Arm’s branding efforts and does not interrogate the extent to which those branding efforts are successful. Such an evaluation would require customer-based evidence. For example, the Dhar Report cites the company’s 2023 SEC F-1 filing to support the statement that “[t]he value that the Arm Trademarks communicate to its customers is based on the pervasiveness and differentiating features of its CPU and ISA [instruction set architecture] offerings.”⁶⁷ The Dhar Report does not provide any evidence that the Arm brand actually has this differentiating impact in the real world (i.e., as a perception among Arm’s real, existing customers).

47. The Dhar Report further states that “[b]eyond building its brand through its performance and partnership with reference customers, Arm has worked to develop its brand among the relevant pool of potential buyers in other ways[,]” including industry events and company-

performs no analysis to show how the awards won by Arm have informed consumer impressions of Arm’s brand. *See* Dhar Report, ¶ 81 (“Second, a brand name and other brand identity elements take on meaning to customers based on repeated experience with the brand as well as from its advertising/promotional efforts and profile in the media.”).

⁶⁷ Dhar Report, ¶ 98.

led webinars.⁶⁸ The Dhar Report presents no evidence that would show the extent to which these efforts are or have been effective, and the Dhar Report fails to provide any evidence of the Arm brand’s broad recognition among the relevant audience. Instead, the Dhar Report merely describes how Arm theoretically, and ideally, would be perceived if Arm’s brand-building efforts are a success.

48. In sum, the sources cited in the Dhar Report do not shed light on what actual or potential purchasers of Arm’s intellectual property understand the Arm brand to mean.

B. The Dhar Report Offers No Evidence to Support Its Description of Arm as a Strong “Ingredient Brand”

49. The Dhar Report repeatedly suggests that products linked to Arm benefit from Arm’s brand strength as an ingredient brand,⁶⁹ but the Dhar Report fails to provide any analysis of Arm *as an* ingredient brand. For example, the Dhar Report defines ingredient branding as “a type of co-branding or a process in which a company markets an established branded ingredient or component used in its own products” and suggests that this marketing strategy “seeks to signal the benefits built on the strong and favorable brand identity of the ingredient (e.g., Arm in this case).”⁷⁰ Yet, the Dhar Report does not analyze Arm as an ingredient brand either in relation to the end-consumers who purchase the end product or

⁶⁸ Dhar Report, ¶ 100.

⁶⁹ See Dhar Report, ¶ 83, 105. See also Dhar Report, ¶¶ 87, 90.

⁷⁰ Dhar Report, ¶ 83.

in relation to industrial customers that operate in Arm’s B2B market — where an ingredient brand’s measurable performance and quality are of utmost importance.⁷¹

50. Ingredient branding is indeed a strategy that identifies the specific brand of individual components (or “ingredients”) of a product or service in an effort to convey a differentiated value to customers,⁷² and ingredient branding can be an important analytical approach to understand marketing efforts along a complex, industrial supply chain. For example, in the chip industry, ingredient branding may be used to distinguish brand identities to end consumers among the various parties overlappingly involved in licensing, designing, testing, or manufacturing chips, integrating those chips into a larger product (such as a laptop), and marketing and selling these products to retailers and consumers.
51. The computing industry in particular has seen many component manufacturers aiming to replicate the success of the “Intel Inside” ingredient branding campaign.⁷³
52. When “Intel Inside” launched in 1991, the Intel brand, which “had been largely unknown to consumers,” became a way for a non-technical audience to “understand that their devices contained quality components provided by the company that defined the state of the art.”⁷⁴

71

[REDACTED]

72 Kotler and Pfoertsch (2010), pp. 2-5, 16-19.

73 See, e.g., Kotler and Pfoertsch (2010), p. 93. (“AMD, MSI, ATI and NVIDIA (CPU, main board and graphic cards manufacturers) [...] have succeeded in securing partnership agreements with PC manufacturers to have their logos shown on the computers. They also convinced the retailers and final users that their component is superior and makes a difference for them.”)

74 “Ingredient Branding: End User Marketing and ‘Intel Inside,’” *Intel*, available at <https://www.intel.com/content/www/us/en/history/virtual-vault/articles/end-user-marketing-intel-inside.html>, accessed on February 12, 2024. See also Kotler and Keller (2016), p. 389 (“Many

The “ingredient” that launched Intel’s campaign was its 386 microprocessor, which represented a “major technological breakthrough” — at least to industry experts in the know — but which initially lagged in sales.⁷⁵ Intel executives pioneered a campaign to educate end consumers about the premium benefits of Intel’s new chip while simultaneously convincing its direct-customer original equipment manufacturers (“OEMs”) to append the “Intel Inside” logo to products containing the chip. The final result was an unprecedented instance of lay consumer brand association with a component computer product (i.e., an ingredient) driving upstream sales.⁷⁶

53. The Dhar Report opines that “Arm offers benefits to downstream customers” and that “[t]he strength of the Arm brand means that products that are linked to Arm (e.g., as an ingredient of the product) are conferred positive associations that have been developed by the Arm

manufacturers make components or materials that enter final branded products but lose their individual identity. One of the few companies that avoided this fate is Intel. Intel’s consumer-directed brand campaign convinced many personal computer buyers to buy only brands with ‘Intel Inside.’ As a result, major PC manufacturers—Dell, HP, Lenovo—typically purchase their chips from Intel at a premium price rather than buy equivalent chips from an unknown supplier.”); Kotler and Pfoertsch (2010), pp. 59-60 (“Although [Intel] was widely recognized among computer manufacturers, the brand had little name recognition amongst end users, despite the fact that Intel microprocessors were the ‘brains’ inside their PCs [...]” “The key to this [ingredient branding] strategy was gaining consumer’s confidence in Intel as a brand and demonstrating the value of buying a microprocessor from the industry’s leader and the pioneer of the microprocessor.”).

⁷⁵ “Ingredient Branding: End User Marketing and ‘Intel Inside,’” *Intel*, available at <https://www.intel.com/content/www/us/en/history/virtual-vault/articles/end-user-marketing-intel-inside.html>, accessed on February 12, 2024.

⁷⁶ “Ingredient Branding: End User Marketing and ‘Intel Inside,’” *Intel*, available at <https://www.intel.com/content/www/us/en/history/virtual-vault/articles/end-user-marketing-intel-inside.html>, accessed on February 12, 2024. *See also* Kotler and Pfoertsch (2010), p. 63 (“However, by 2002, the Intel Inside initiative had become one of the world’s largest cooperative marketing programs with over 1,000 PC makers using the logo (a total of 2,700 computer makers licensed). Intel and other companies had spent over \$4 billion on advertising since the slogan was launched in 1991, and the Intel brand had been ranked many times as one of the top 10 best-known brands in the world.”); Kotler and Pfoertsch (2010), p. 69 (“The implementation of the [Intel Inside] Ingredient Branding concept resulted in an unprecedented business success and changed the industry structure.”).

brand over the years of successful innovation.”⁷⁷ The Dhar Report further opines that as a result “Qualcomm’s unauthorized use of Arm’s Trademark in connection with the Nuvia Products will likely divert sales from authorized users of Arm’s Trademark.”⁷⁸

54. The Dhar Report does not apply to its analysis of Arm’s brand any established marketing knowledge or literature about what constitutes a successful ingredient brand. For example, Kotler and Pfoertsch’s textbook on ingredient branding identifies several approaches for assessing the value of ingredient brands, such as applying methods to assess brand equity, brand loyalty, brand trust, brand awareness, recognized quality, and brand associations.⁷⁹ For instance, a successful ingredient brand is one for which its consumers “believe the ingredient matters to the performance and success of the end product,” and where consumers are “convinced that not all ingredient brands are the same and that the ingredient is superior.”⁸⁰ Further, consumers “do not necessarily have to know exactly how the ingredient works—just that it adds value.”⁸¹ For instance, to measure what that value is and “measur[e] Ingredient Branding success” “at this [B2B] stage, it is recommended that a financially oriented measurement tool based on price premiums be used.”⁸²

⁷⁷ Dhar Report, ¶¶ 103, 105.

⁷⁸ Dhar Report, ¶ 132.

⁷⁹ Kotler and Pfoertsch (2010), pp. 310-314.

⁸⁰ Kotler and Keller (2016), p. 390.

⁸¹ Keller and Swaminathan (2020), p. 277.

⁸² Kotler and Pfoertsch (2010), p. 319.

55. By failing to provide any end-customer-based evidence of Arm’s strength as an ingredient brand or apply any established marketing criteria or method, the Dhar Report fails to establish reliable foundations for its conclusions on Arm’s strength as an ingredient brand.
56. Instead of providing end-customer-based evidence, the Dhar Report states without support that “products that are linked to Arm (e.g., as an ingredient of the product) are conferred positive associations that have been developed by the Arm brand over the years of successful innovation.”⁸³ Dr. Dhar does not offer any specific evidence for how Qualcomm or any of Arm’s other industrial customers benefit from the (undemonstrated) strength of Arm as an ingredient brand in their products. Further, despite stating that a brand’s “mentions as an ingredient of the product by the licensee and media are important factors in establishing brand awareness and a brand image,”⁸⁴ the Dhar Report contains no analysis on whether this is the case for Arm. Indeed, the Dhar Report offers no evidence that Arm has taken any affirmative steps to market itself as an ingredient brand. Far from Intel’s campaign to instill the value of Intel technology in the minds of consumers, the Dhar Report does not point to *any* consumer-facing advertisements by Arm, let alone a sustained effort to establish itself as an ingredient brand.
57. Without any customer-based analysis or application of established marketing knowledge to assess the success of an ingredient brand, the Dhar Report cannot establish that the Arm

⁸³ Dhar Report, ¶ 105. *See also* Dhar Report, ¶ 97 (“Arm’s offerings [...] enable its licensees to develop, manufacture, and sell a wide range of technology products—including smartphones, tablets and personal computers, data centers and networking equipment, vehicles, smartwatches, thermostats, and drones and industrial robotics—to their own customers.”).

⁸⁴ Dhar Report, ¶ 87.

brand is a strong ingredient brand in either Arm’s B2B market or, ultimately, in end-consumers’ decisions to purchase an Arm-based end product.

C. The Dhar Report Fails to Consider the Extent to Which Qualcomm’s Brand Plays a Role in Marketing Qualcomm’s Arm-based Products to Consumers

58. The Dhar Report’s implication that Arm’s brand is an ingredient in the overall success of end products among downstream consumers fails to consider the potentially significant role of other brands and brand components, including Qualcomm’s, in these end products’ marketing or commercial success. In particular, the Dhar Report neglects whether end consumers (i.e., consumers who purchase end products with Arm-compatible chips) are provided with any information about Arm when making their purchases of products with Arm-based technologies, and whether these efforts, to the extent they occur, are effective. This immediately raises the question as to whether the Arm brand could possibly have high end-consumer awareness.
59. Furthermore, the Dhar Report fails to consider the potentially important role of Qualcomm’s own brand in the marketing of Qualcomm OEM products. It devotes no attention at all to how Qualcomm markets its OEM products.
60. Qualcomm presumably has its own (arguably strong) brand reputation in the relevant marketplace, and would similarly “impact consumer purchase behavior,” “take on meaning to customers based on repeated experience with the brand,” and “serve to reduce the risk associated with product purchase decisions,”⁸⁵ as the Dhar Report describes in its own rubric for a theoretical strong brand. The Dhar Report, however, contains no analysis of the

⁸⁵ Dhar Report, ¶¶ 80-82.

interplay between Arm’s branding and the OEMs who offer final products that result, in some form, from a relationship with Arm. Such an analysis is needed as it may be the case that Qualcomm’s brand, and the brands of other Arm B2B customers, are more recognizable among relevant end-consumers than Arm’s. For example, Qualcomm’s brand, and in particular the logo and branding of its Snapdragon product line, is often prominently displayed on certain products that are marketed as containing Qualcomm components.⁸⁶ Further, Qualcomm’s Snapdragon brand has also been prominently featured in promotional imagery for Samsung phones, the second-best-selling smartphone brand in the U.S.,⁸⁷ and in connection with Lenovo laptops, as shown in **Figure 1** and **Figure 2** below.

⁸⁶ See, e.g., “HP Laptop 14” FHD, Touch, Qualcomm Snapdragon 7c Gen 2, 4GB RAM, 128 GB eMMC, Silver, Windows 11, 14-ed0123wm,” *Walmart*, available at <https://www.walmart.com/ip/HP-Laptop-14-FHD-Touch-Qualcomm-Snapdragon-7c-Gen-2-4GB-RAM-128-GB-eMMC-Silver-Windows-11-14-ed0123wm/185295507>, accessed on February 19, 2024; “Acer Chromebook Spin 513,” *Acer*, available at <https://www.acer.com/us-en/chromebooks/acer-chromebook-spin-513-cp513-1h-cp513-1hl-r841lt-r841t>, accessed on February 19, 2024; “Meet Galaxy Book Go,” *Samsung*, available at <https://www.samsung.com/us/app/computing/galaxy-book-go/>, accessed on February 19, 2024; “Snapdragon for Inspiron 14,” *Dell*, available at <https://www.dell.com/en-us/lp/qualcomm-snapdragon>, accessed on February 19, 2024.

⁸⁷ “Manufacturers’ Market Share of Smartphone Sales in the United States from 1st Quarter 2016 to 2nd Quarter 2023,” *Statista*, October 27, 2023, available at <https://www.statista.com/statistics/620805/smartphone-sales-market-share-in-the-us-by-vendor/>.

**Figure 1. Qualcomm Snapdragon Branding Elements in Promotional Imagery for
Samsung Galaxy Phones⁸⁸**



⁸⁸ @SamsungMobile, "Battle your way to victory with the upgraded Snapdragon® 8 Gen 2 Mobile Platform. 🎮 #GalaxyZFold5 #JoinTheFlipSide #SamsungUnpacked," X, available at <https://x.com/samsungmobile/status/1684163305437532160?s=51>, accessed on February 19, 2024.

**Figure 2. Qualcomm Snapdragon Branding Elements in Promotional Imagery for
Lenovo ThinkPad Laptops⁸⁹**



61. By failing to include any analysis of the ecosystem of other brands that surround Arm and Arm’s technologies, the Dhar Report cannot, for example, disentangle any brand associations customers might (or might not) hold for Arm from those that they might hold for other parties, among the relevant industrial and/or end-consumer audience. Further, the Dhar Report fails to consider that, due to Qualcomm’s own brand positioning, it may be the case that Qualcomm could further Arm’s objective to build a strong brand. As such, the Dhar Report cannot rule out, for example, that Qualcomm’s own marketing could add to any goodwill associated with the Arm brand and the Arm Trademarks rather than detract

⁸⁹ “ThinkPad X13s Snapdragon (13”),” *Lenovo*, available at [https://www.lenovo.com/us/en/p/laptops/thinkpad/thinkpadx/thinkpad--x13s-\(13-inch-snapdragon\)/21bx0008us?orgRef=https%253A%252F%252Fwww.google.com%252F](https://www.lenovo.com/us/en/p/laptops/thinkpad/thinkpadx/thinkpad--x13s-(13-inch-snapdragon)/21bx0008us?orgRef=https%253A%252F%252Fwww.google.com%252F), accessed on February 19, 2024.

from it, and his conclusion that end products “are conferred positive associations” due to the “strength of the Arm brand” lack context informed by the real-world industry and are wholly unsupported.⁹⁰

62. In sum, the Dhar Report fails to put forward a rigorous analysis of the Arm brand through any of: (1) an established and replicable empirical framework, (2) the employment of neutral, empirical, and consumer-based evidence, and (3) an appropriately defined context for Arm’s brand strength within the relevant industry. As a result, the Dhar Report merely assumes the strength of the Arm brand.

V. THE DHAR REPORT’S ASSERTION THAT QUALCOMM’S USE OF THE ARM TRADEMARKS IS LIKELY TO CAUSE CONFUSION IS BASELESS

63. The Dhar Report concludes that “Qualcomm’s use of Arm’s Trademarks is likely to cause customer confusion” and “is likely to mislead customers and other relevant industry participants into believing that there is some connection as to source, affiliation, sponsorship, or approval between Arm and Qualcomm.”⁹¹ These conclusions are baseless for several reasons. *First*, the Dhar Report inappropriately points to Qualcomm’s historical uses of the Arm Trademarks to assume that Qualcomm will likely use the Arm Trademarks in the same way in the future. *Second*, the Dhar Report’s conclusions regarding confusion are flawed because the Dhar Report fails to consider the sophistication of the B2B industrial procurement departments that purchase Qualcomm’s chips, which are highly trained and

⁹⁰ Dhar Report, ¶ 105 (“The strength of the Arm brand means that products that are linked to Arm (e.g., as an ingredient of the product) are conferred positive associations that have been developed by the Arm brand over the years of successful innovation.”).

⁹¹ Dhar Report, ¶ 15.

may therefore be unlikely to be confused by uses of the Arm Trademarks to describe Qualcomm custom cores’ technical attributes. *Third*, the Dhar Report’s assertion that Qualcomm’s purported use of the Arm Trademarks creates a false understanding of the custom cores’ affiliation, sponsorship, or certification is unsupported. *Fourth*, the Dhar Report presents no evidence of any actual confusion caused by Qualcomm’s purported use of the Arm Trademarks, and the report overlooks admissions by Arm and testimony from Arm’s corporate deponents that indicate that Arm itself has been unaware of any actual confusion.

A. The Dhar Report Fails to Consider That Qualcomm’s Purportedly Infringing Use of the Arm Trademarks Is Distinct from Qualcomm’s Historical Uses of the Arm Trademarks

64. The Dhar Report offers the unfounded opinion that “Qualcomm’s prior history and usage of Arm’s Trademarks, along with requirements in the relevant agreements and materials that it will provide to customers, demonstrate a *high likelihood* (emphasis added) that Qualcomm will continue to use Arm’s Trademarks in connection with its future products, particularly Nuvia Products.”⁹² The Dhar Report inappropriately assumes that past usage indicates future usage, particularly under different circumstances. In particular, the Dhar Report’s conclusion that Qualcomm’s use of the Arm Trademarks is likely to create confusion is partly based on the Dhar Report’s analysis of Qualcomm’s prior use of the Arm Trademarks in connection with Arm-built CPU cores, rather than Qualcomm’s *custom-designed* cores that are compatible with the Arm ISA.

⁹² Dhar Report, ¶ 14 (emphasis added).

65. Specifically, the Dhar Report points to the following examples⁹³ of historical Qualcomm uses of Arm Trademarks, which relate to *Arm-built cores* licensed by Qualcomm under its TLA:

- a. A 2022 Qualcomm Application Processors Selector Guide, which describes technical specifications for certain Qualcomm SoCs in the Internet of Things (“IoT”) segment (e.g., the Qualcomm® APQ8053Pro, which is described as having a “8x Arm Cortex A53 CPU”);⁹⁴
- b. A September 2016 Device Specification for Qualcomm’s Snapdragon 410E (APQ 8016E) processor, which describes the technical specifications of this processor as having an “ARM Cortex-A53” CPU.⁹⁵
- c. A 2022 article published online in *Business Insider India* about the Qualcomm 2022 Tech Summit and the Kryo CPU, which the article notes was built “on the latest ARM-V9 architecture.”⁹⁶

⁹³ The Dhar Report additionally points to a February 2022 press release “published in relation to the 2022 Mobile World Congress event,” which makes general statements about the “Arm®-based Snapdragon computing ecosystem” and which suggests “[t]ogether with Qualcomm Technologies, global OEMs deliver Windows 11 on Arm PCs.” See Dhar Report, ¶ 111. This use of “Arm-based” strikes me as consistent with the instructions found in the “Referential use of Arm’s trademarks” section of Arm’s publicly-available Trademark Use Guidelines (which I discuss in more detail in Section V.C) and merely refers to the Arm Trademarks to describe the ISA that Qualcomm’s custom core chip implements.

⁹⁴ Dhar Report, ¶ 107, citing “Qualcomm Application Processors Selector Guide,” *Qualcomm*, 2022, available at <https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/application-processors-selection-guide.pdf>.

⁹⁵ Dhar Report, ¶ 108, citing “Qualcomm® Snapdragon 410E (APQ 8016E) Processor Device Specification,” *Qualcomm*, September 2016, available at https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/snapdragon_410e_apq_8016e_data_sheet.pdf.

⁹⁶ Dhar Report, ¶ 109, citing Jain, Sourabh, “Qualcomm Snapdragon Tech Summit 2022 — Snapdragon 8 Gen 2, [REDACTED] CPU, AR2 Gen 1 Platform, and Other Announcements,” *Business Insider India*, November 17, 2022, available at [https://www.businessinsider.in/tech/news/qualcomm-snapdragon-tech-summit-2022-snapdragon-8-gen-2-\[REDACTED\]-cpu-ar2-gen-1-platform-and-other-announcements/articleshow/95581109.cms](https://www.businessinsider.in/tech/news/qualcomm-snapdragon-tech-summit-2022-snapdragon-8-gen-2-[REDACTED]-cpu-ar2-gen-1-platform-and-other-announcements/articleshow/95581109.cms).

d. A 2023 “Snapdragon 8 gen 3 Mobile Platform Product Brief,”⁹⁷ which describes the technical specifications of the Qualcomm Kryo CPU as containing “Arm Cortex-X4 technology.”⁹⁸

66. Notably, I understand that these “historical” uses cited in the Dhar Report (with the exception of the *Business Insider India* article)⁹⁹ are focused on the use of Arm as a source-designator: they tell consumers that the Qualcomm product contains a specific type of *Arm-built core*. However, when Qualcomm markets *its own, custom cores*, which are compatible with the Arm ISA, the company is marketing a different offering that does not leverage Arm-built cores.¹⁰⁰ The Dhar Report ignores the fact that this different use would in fact likely lead to different marketing strategies. In particular, the Dhar Report ignores that Qualcomm currently uses the Arm Trademarks in connection with its custom cores to *refer*

⁹⁷ Dhar Report, ¶ 110, citing “Snapdragon® 8 Gen 3 Mobile Platform,” *Qualcomm*, October 23, 2023, https://docs.qualcomm.com/bundle/publicresource/87-71408-1_REV_B_Snapdragon_8_gen_3_Mobile_Platform_Product_Brief.pdf.

⁹⁸ Dhar Report, ¶ 110, citing “Snapdragon® 8 Gen 3 Mobile Platform,” *Qualcomm*, October 23, 2023, https://docs.qualcomm.com/bundle/publicresource/87-71408-1_REV_B_Snapdragon_8_gen_3_Mobile_Platform_Product_Brief.pdf.

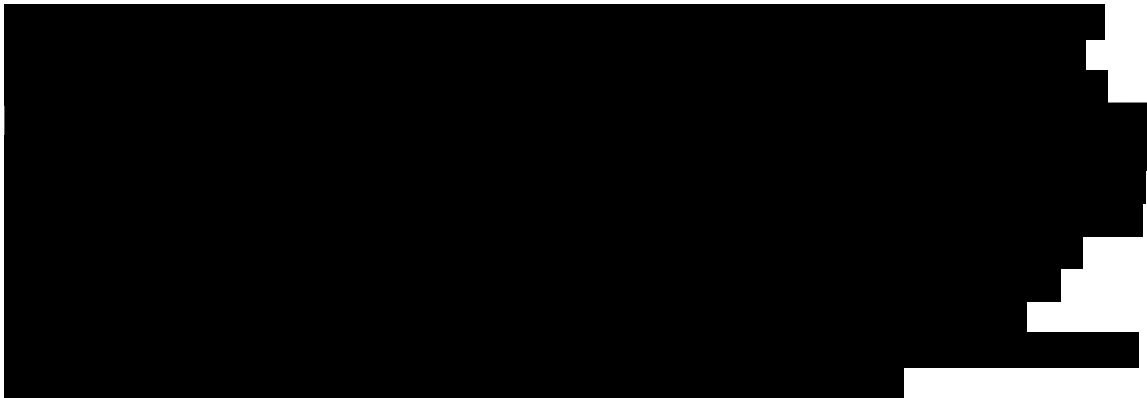
⁹⁹ The Dhar Report mischaracterizes the *Business Insider India* source by claiming “[at] Qualcomm’s 2022 Tech Summit, it announced that its Kryo CPU will be ‘built on the latest ARM-V9 architecture,’” which suggests Qualcomm itself produced that quote. In reality, it was the author of the article who wrote “[t]he Snapdragon 8 Gen 2 chipset is equipped with the new Kryo CPU built on the latest ARM-V9 architecture.” It is not clear from the source cited in the Dhar Report how Qualcomm used the Arm Trademarks if at all in its announcement at its 2022 Tech Summit. See Dhar Report, ¶ 109, citing Jain, Sourabh, “Qualcomm Snapdragon Tech Summit 2022 — Snapdragon 8 Gen 2, [REDACTED] CPU, AR2 Gen 1 Platform, and Other Announcements,” *Business Insider India*, November 17, 2022, available at [https://www.businessinsider.in/tech/news/qualcomm-snapdragon-tech-summit-2022-snapdragon-8-gen-2-\[REDACTED\]-cpu-ar2-gen-1-platform-and-other-announcements/articleshow/95581109.cms](https://www.businessinsider.in/tech/news/qualcomm-snapdragon-tech-summit-2022-snapdragon-8-gen-2-[REDACTED]-cpu-ar2-gen-1-platform-and-other-announcements/articleshow/95581109.cms).

¹⁰⁰ See, e.g., “Qualcomm Announces Next-Generation Snapdragon Mobile Chipset Family,” *Qualcomm*, February 13, 2011, available at <https://www.qualcomm.com/news/releases/2011/02/qualcomm-announces-next-generation-snapdragon-mobile-chipset-family>. See also ARM_00088656–684 at 662, 671 (explaining that “architectural licensees do *not* use Arm’s CPU designs,” but rather “create their *own* proprietary CPU designs using their *own* engineering teams,” and that, as a result, architectural licensees’ CPU designs compete against Arm-built “off-the-shelf” CPU implementations. Emphasis in original.).

to the technical capabilities of its products.¹⁰¹ That is, Qualcomm does not purport to use the “Arm” word mark to indicate that a certain Arm core is being used, but rather only to provide a description of the technical attributes of the product — that the core is compatible with the Arm ISA.

67. The Dhar Report does not appear to dispute that Qualcomm’s current use of the Arm Trademarks in connection with Qualcomm’s publicly announced custom cores are limited to uses such as “Arm-based,” “Arm-compatible,” or “Arm-compliant.” The Dhar Report cites to only two examples¹⁰² of any Qualcomm marketing materials using the Arm word mark (and none using the Arm logo) in connection with public descriptions by Qualcomm pertaining to its custom core technologies — the *only* technologies that I understand are at issue in this litigation:

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¹⁰² I note the Dhar Report cites three sources relating to Qualcomm’s current use of the Arm Trademarks. However, because the first of the three, a Qualcomm press release published on January 3, 2022 stating there is “broad support from ecosystem partners for the PC industry’s transition to Arm®-based computing,” and that Qualcomm’s “acquisition of NUVIA uniquely positions Qualcomm Technologies to drive this industry wide transition,” was published prior to the announcement of Qualcomm’s first custom core (the Qualcomm [REDACTED] Custom Core), it is therefore more accurately considered a historical use of the Arm Trademark. I further note that the Dhar Report cites a press release that was published *after* the January 3, 2022 press release as a *historical* use of the Arm Trademark, which further supports its classification as also an instance of historical use. See Dhar Report, ¶¶ 112(a), 111.

- a. “At Qualcomm’s 2023 Snapdragon Summit, Director of Product Management Manju Varma announced that the [REDACTED] CPU would be the first ‘CPU on Arm-based architecture to hit over 4GHz,’¹⁰³ and
- b. “On Qualcomm’s November 1, 2023, Earnings Call, Qualcomm CEO Cristiano Amon explained the Snapdragon X Elite ‘Arm-based PC processor ... is going to be part of the expansion of TAM [Total Addressable Market] for Qualcomm[.]’”¹⁰⁴

68. These uses of the Arm Trademarks are distinguished from the Dhar Report’s citations of Qualcomm’s historical uses of the Arm Trademarks in that they incorporate a modifier like “-based,” “-compliant,” or “-compatible” and are used in factually accurate statements about Qualcomm’s products — not as a branding description of the product itself.¹⁰⁵ The Dhar Report does not address this distinction whatsoever; nor does it offer any empirical evidence on how relevant B2B customers understand or perceive the terms “Arm-based,” “Arm-compliant,” or “Arm-compatible.” The Dhar Report simply ignores that Qualcomm’s uses of the Arm Trademarks in connection with the Qualcomm custom cores may be referential only. “Referential use,” as I use it in this report, describes situations in which someone uses a term (which can be a trademark) to *refer to* or describe a product or

¹⁰³ Dhar Report, ¶ 112(b), citing ARM_01422901 at 37:32.

¹⁰⁴ Dhar Report, ¶ 112(c), citing “Qualcomm (QCOM) Q4 2023 Earnings Call Transcript,” *The Motley Fool*, September 30, 2023, available at <https://www.fool.com/earnings/call-transcripts/2023/11/01/qualcomm-qcom-q4-2023-earnings-call-transcript/>.

¹⁰⁵ The other examples cited in the Dhar Report of statements by Qualcomm concerning its development of the Qualcomm custom cores focus on the use of the term Nuvia – not the use of the Arm Trademarks. For example, the Dhar Report cited Qualcomm statements that, by “late next year, beginning 2024, you’re going to see Windows PCs powered by Snapdragon with a *Nuvia-designed CPU*,” and that “the creation of our custom CPU was *started by Nuvia engineers while employed at Nuvia*” (emphasis added). See Dhar Report, ¶ 116. The Dhar Report purports that this would confuse the sophisticated purchasers of Qualcomm’s products about the “sponsorship, affiliation, or certification of the Nuvia Products by Arm,” but cites no evidence or methodology to support this statement.

service in a manner that aids identification.¹⁰⁶ As I will discuss in more detail in **Section V.C** below, Qualcomm’s uses of the Arm Trademarks in connection with Qualcomm *custom cores* to refer to the technical capabilities of Qualcomm’s products are different from Qualcomm’s prior uses of the Arm Trademarks in connection with other Qualcomm products that use *Arm-built cores* licensed by Qualcomm.

69. The Dhar Report overlooks this critical distinction, provides no basis for arguing that Qualcomm’s future uses of the Arm Trademarks will be anything other than referential, and consequently has no scientific basis from which to assert that Qualcomm’s use of the Arm Trademarks are likely to cause confusion.

B. The Dhar Report’s Analysis of Confusion Fails to Take into Account That Arm Operates in a Business-to-Business Market Where Customers Are More Sophisticated Than General Consumers and Therefore Less Likely to Be Confused

70. The Dhar Report fails to factor in the unique context of B2B transactions within the chip industry. Despite acknowledging the sophistication of both Arm’s and Qualcomm’s B2B customers,¹⁰⁷ the Dhar Report fails to adequately address this aspect, leading to a conclusion that lacks credibility. Consequently, its assertion regarding the likely confusion caused by Qualcomm’s use of the term “Arm-based” or “Arm-compliant” among sophisticated and knowledgeable procurement professionals, such as engineers, is

¹⁰⁶ I understand there is a legal application of the term “referential use” that has similarities with my use of the term. *See, e.g.*, “Fair Use of Trademarks (Intended for a Non-Legal Audience),” *International Trademark Association*, December 16, 2020, available at <https://www.inta.org/fact-sheets/fair-use-of-trademarks-intended-for-a-non-legal-audience/>.

¹⁰⁷ *See* Dhar Report, ¶ 95 (“B2B products are generally purchased by a group within an organization rather than a single individual, and as such can be subject to complex within-firm restrictions and negotiations.”), citing Kotler, Philip, and Waldemar Pfoertsch, *B2B Brand Management*, Springer, 2006 (“Kotler and Pfoertsch (2006)”), p. 24.

unfounded. Furthermore, the Dhar Report’s failure to conduct an empirical analysis of customer confusion, particularly within the relevant market of purchasers, highlights the lack of concrete support for its conclusions and, as such, leaves us no choice but to simply accept his word for it.

71. Industrial Marketing is the marketing of goods and services by one business to another, often referred to as business-to-business or “B2B” marketing. Compared to broader consumer audiences for final products, customers in a business-to-business, industrial marketplace are highly sophisticated and technically competent: they can be expected to evaluate and understand marketing statements in the context of the relevant industry.¹⁰⁸ B2B marketing is a long-term process that includes a great deal of scrutiny, close supplier-customer relationships, and often significant exchanges of money,¹⁰⁹ and therefore offers less potential for confusion, compared to marketing for end consumers.
72. Procurement departments in the engineering sector often include engineers focused on defining the parameters of components they need in order to bring their ultimate product to market.¹¹⁰ In this context, the component (such as an engine for a car) is not purchased based just on brand strength — rather, it is often the case that procurement decisions are about the ability to hit tightly-defined engineering objectives that focus on how the

¹⁰⁸ Kotler and Keller (2016), pp. 191-192. *See also* Turley, Lou, and Scott Kelley, “A Comparison of Advertising Content: Business to Business Versus Consumer Services,” *Journal of Advertising*, Vol. 26, No. 4, 1997, pp. 39-48, p. 40 (“For example, business-to-business services have several distinctive characteristics that may differentiate them from consumer services... such as a more rational buying process, longer term relationships, greater product complexity, larger amounts of money exchanged, greater use of group decision making, and the design of customized service mixes unique to particular organizations.”).

¹⁰⁹ Kotler and Keller (2016), pp. 191-192.

¹¹⁰ Kotler and Keller (2016), pp. 192, 199.

component will fit into the final product. Whether a component (the engine) is from company A or B may not matter as much in a B2B setting as a brand in a B2C setting, so long as the parameters are right and the component fits precisely (that is, the engine has the right technical specifications for that particular car).¹¹¹ The concept of interoperability is key — the component needs to be able to work (and work well) within the larger product in order to bring that product to market.¹¹² To determine interoperability, the engineers involved in the procurement process are likely to assess the technical specifications, and will usually test the performance of the components as well.¹¹³

73. While the Dhar Report does not describe this process in detail, it recognizes that Arm and Qualcomm operate in a business-to-business market — and that customers in such markets are highly sophisticated. For example, the Dhar Report acknowledges that “[t]he products sold by B2B firms are often more complex, and buying transactions often involve significant technical expertise on both sides.”¹¹⁴ In a market such as that described in the

¹¹¹ For example, the start-up car manufacturer INEOS chose to fit its flagship model, the Grenadier, with a BMW-sourced engine, noting that the engine’s impressive performance and reliability fit its design requirements nicely. *See* “Building the Grenadier: Episode 5 – Engine and Transmission,” *INEOS*, available at <https://ineosgrenadier.com/en/us/explore/the-grenadier-videos-and-stories/building-the-grenadier/engine-and-transmission>, accessed on February 14, 2024.

¹¹² Wegner, Peter, “Interoperability,” *ACM Computing Surveys (CSUR)*, Vol. 28, No. 1, 1996, pp. 285-287, at p. 285 (“Interoperability is the ability of two or more software components to cooperate despite differences in language, interface, and execution platform.”)

¹¹³ 

¹¹⁴ Dhar Report, ¶ 95, citing Kotler and Pfoertsch (2006), p. 21.

Dhar Report, the important consideration for confusion is whether a chip-industry business-to-business customer (such as a decision-maker or procurement manager at Samsung) and not any specific individual or, importantly, end consumers, is likely to be confused by Qualcomm’s purported use of the Arm Trademarks. The Dhar Report fails to examine likelihood of confusion through this lens; it does not analyze whether Qualcomm’s actual customers (or similar market participants) are likely to be confused by Qualcomm’s purported use of the Arm Trademarks.

74. The Dhar Report does not grapple at all with the sophistication of the B2B procurement process in the industrial space. It does not even once mention the corporate procurement departments or the types of factors they consider in their purchasing decisions. Though the Dhar Report acknowledges that “buying transactions [between B2B firms] often involve significant technical expertise on both sides,”¹¹⁵ it does not expand upon what “technical expertise” means, nor does it mention that there are often embedded engineers in procurement departments that influence purchasing decisions.¹¹⁶ Further, the Dhar Report does not identify what information is likely to be relevant to those engineers in evaluating chip technology and ultimately in making purchasing decisions.
75. To analyze whether the relevant audience for Qualcomm’s marketing communications (i.e., industrial procurement specialists) are, in fact, likely to be confused by Qualcomm’s

¹¹⁵ Dhar Report, ¶ 95.

¹¹⁶ See, e.g., “Senior Manager, Sourcing,” *Qualcomm*, available at <https://careers.qualcomm.com/careers/job/446697478074>, accessed on February 26, 2024. Key responsibilities for this position within Qualcomm include “[w]ork with cross functional teams, external manufacturing partners and suppliers to ensure availability of Test Equipment and Hardware for engineering builds and high-volume production” and “[w]ork with product test engineering to define Test roadmaps and drive suppliers to deliver to Qualcomm’s specification.”

purported use of the Arm Trademarks, I would have expected Dr. Dhar to conduct a survey or other empirical analysis to produce customer-based evidence to support its statements about the likelihood of confusion concerning Qualcomm’s purported use of the Arm Trademarks. Its failure to produce such empirical customer-based evidence is inconsistent with Dr. Dhar’s prior practices.¹¹⁷ The Dhar Report presents no evidence that any empirical analysis of relevant personnel at companies that procure chips or other relevant industrial products was conducted to determine whether Qualcomm’s use of the Arm Trademarks to describe attributes of its own products is likely to be confusing. In fact, it is likely that these specialist purchasers of Qualcomm’s products would view a term such as “Arm-based” as an indication of the technical attributes of the chip, rather than as an indicator of source.¹¹⁸ Similarly, it does not determine whether the B2B purchasers of Qualcomm’s products would even look at the types of marketing materials cited in the Dhar Report when making purchasing decisions, or whether they would instead rely on other sources of information.

¹¹⁷ I am aware of prior instances in which Dr. Dhar has indeed used surveys or other empirical analyses to support his expert opinions on trademark infringement and likelihood of confusion with customer-based evidence. For example, in February 2016, Dr. Dhar submitted an expert report on behalf of Chrysler Group in the *Moab Industries v. Chrysler Group* matter, for which he conducted a likelihood of confusion survey. Dr. Dhar found that “the level of confusion between the MOAB INDUSTRIES word mark and Chrysler Group’s MOAB mark used in connection with the Jeep brand is de minimis when tested in realistic marketplace conditions.” Further, Dr. Dhar’s opinions drew on the marketplace realities for the relevant consumers of a high-involvement good like a new car: “In summary, the higher involvement in the purchase decision will lead to consumers exercising a very high degree of care in gathering information on the purchase including that of source of the goods purchased.” *See* Expert Report of Ravi Dhar, *Moab Industries, LLC. v. Chrysler Group LLC*, C.A. No. 3:12-cv-08247-HRH, United States District Court for the District of Arizona, March 7, 2014, ¶¶ 14, 50. Dr. Dhar chose not to conduct any type of similar, customer-based analysis in the course of preparing the present Dhar Report.

¹¹⁸

[REDACTED]

76. Without adequately considering the critical context of B2B transactions in the relevant chip industry or offering concrete evidence of actual or potential confusion, the Dhar Report lacks any basis for its argument that the mere use of the term “Arm-based” or “Arm-compliant” is likely to be confusing to those sophisticated procurement professionals, including engineers. Because the Dhar Report acknowledges, but completely disregards, the sophistication of Arm’s and Qualcomm’s customers, its conclusion that purchasers would likely be confused lacks basis and credibility. Further, the Dhar Report’s failure to undertake any defensible analysis of consumer confusion at all underscores that its opinions are factually and methodologically unsupported.

C. The Dhar Report’s Conclusion That Qualcomm’s Use of the Arm Trademarks Creates Any False Understanding of Affiliation, Sponsorship, or Certification as to Source Is Unsupported

77. The Dhar Report claims that Qualcomm’s purportedly unauthorized use of the Arm Trademarks falsely conveys affiliation, sponsorship, or certification as to source.¹¹⁹ Yet, it fails to provide any valid scientific evidence that sophisticated and specialized purchasers of Qualcomm products would interpret the terms “Arm-based” and “Arm-compliant” as the Dhar Report appears to conclude that they would. Further, the Dhar Report disregards that Qualcomm’s purported use of the Arm Trademarks simply identifies technical aspects of its products and that, in the complex tech industry, it is common for companies to articulate the connections between various product components, even in cases where there exists no formal business affiliation among the producers of said components. Finally, the

¹¹⁹ Dhar Report, ¶ 136 (“Qualcomm’s unauthorized use of the Arm Trademarks, in particular phrases such as ‘Arm-based’ and ‘Arm compliant,’ falsely signifies that the Nuvia Products have been connection [sic] as to source, affiliation, sponsorship, or approval from Arm and have been verified and validated by Arm and that the Nuvia Products are covered by an applicable license to Arm Technology.”).

Dhar Report provides quotes from certain news articles without any support that its interpretation of those quotes is aligned with how a relevant audience would interpret them, and without establishing that sophisticated industrial procurement departments would rely on these or similar sources for their purchase decisions. As such, the Dhar Report’s conclusion that Qualcomm’s use of the Arm Trademarks creates false understanding of affiliation, sponsorship, or certification as to source is unfounded.

78. The Dhar Report maintains, without basis, that “Qualcomm’s unauthorized use of the Arm Trademarks, in particular phrases such as ‘Arm-based’ and ‘Arm compliant,’ falsely signifies that the Nuvia Products have been connection [sic] as to source, affiliation, sponsorship, or approval from Arm and have been verified and validated by Arm and that the Nuvia Products are covered by an applicable license to Arm Technology.”¹²⁰
79. Yet, the materials that I have reviewed, including Arm’s Branding Guidelines and Arm’s Trademark Use Guidelines, do not suggest that written authorization,¹²¹ contact with Arm’s

¹²⁰ Dhar Report, ¶ 136.

¹²¹ Arm’s Trademark Use Guidelines instruct third parties to seek written authorization from Arm’s trademarks team for use of the Arm logo and copyright materials, but do not include an analogous instruction for what it calls “referential use” of the Arm word mark. The Dhar Report does not consider the Arm’s Trademark Use Guidelines. *See* QCARM_7517739–744 at 739, 741-742.

trademarks team,¹²² or any “approval” or having been “verified and validated”¹²³ by Arm is required for what Arm itself defines as “referential use” of the Arm Trademarks.¹²⁴

80. Moreover, the Dhar Report offers no empirical analysis to determine whether Qualcomm’s use of terms such as “Arm-based” or “Arm-compliant” generally connotes any affiliation, sponsorship, approval, validation, or otherwise certification by Arm. Instead, the Dhar Report relies merely on deposition testimony from two individuals — Will Abbey, Arm’s Executive VP and Chief Commercial Officer, [REDACTED] — to conclude that “[t]erms such as ‘Arm-based’ and ‘Arm-compliant’ have a particular meaning within the relevant market, which conveys endorsement and sign-off by Arm of such products,” and that “these terms/phrases convey to industry participants that a CPU has been verified and validated by Arm according to the process specified in an applicable license agreement.”¹²⁵

¹²² Jonathan Armstrong, Arm’s Head of Brand and Creative Services, answered affirmatively when asked in deposition whether it is “required [...] for every third party to contact Arm’s trademarks team every time it would like to use Arm’s word trademarks in connection with a reference to Arm’s products, services, or related technologies[.]” *See* Armstrong Deposition, p. 126:11-20. However, this testimony is contradicted by Arm’s Trademark Use Guidelines, which do not indicate that Arm would need to be contacted for referential use of the Arm word mark. *See* QCARM_7517739–744.

¹²³ Dhar Report, ¶ 136.

¹²⁴ Arm itself puts forward the use of the term “Arm-based” as appropriate in these circumstances. *See* QCARM_7517739–744 at 741-742. Similarly, in deposition testimony that Dr. Dhar relies on to support his claim that “Companies will negotiate the use of these terms [e.g., “Arm-based”] with Arm,” Jonathan Armstrong states that Arm “will, you know, have review and discuss and understand exactly what the use of – or why they need to use the brand or the logo or why they’re even referencing Arm-based if they don’t have a license.” This type of *internal* discussion within Arm suggests a reaction to third parties having followed the “referential use” guidelines in Arm’s Trademark Use Guidelines, and not a statement about discussions with third parties *prior to* use of a term such as “Arm-based.” *See* Dhar Report, ¶ 55, citing Armstrong Deposition, p. 78:10-18.

¹²⁵ Dhar Report, ¶ 117.

81. Dr. Dhar’s reliance on this testimony is misplaced. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. Similarly, Mr. Abbey testified that “[t]he definition *in [his] mind* (emphasis added) of compatibility is that it passes the verification suite.”¹²⁶ The Dhar Report offers no evidence, empirical or otherwise, that purchasers of Qualcomm’s products would hold the same or similar belief regarding the definition of “compatibility” with respect to CPU architecture as Arm’s Chief Commercial Officer, and consequently the Dhar Report offers no basis to assume they would.

82. The Dhar Report also misleadingly quotes [REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹²⁶ Abbey Deposition, p. 84:8-25 (“Q. Okay. When I asked you whether architectural licensees have designed their own CPUs compatible with the Arm ISA, you said they would need to go through verification; is that right? Is that what you said? A. Yes. Q. Okay. That doesn’t appear here; does it? [] THE WITNESS: Doesn’t appear where? Q. It doesn’t appear in this sentence that was made – that was submitted to a regulator? A. No. Q. Why do you think that that’s an important – an important point? A. The definition *in my mind* of compatibility is that it passes the verification suite.” Emphasis added).

¹²⁷ Dhar Report, ¶ 113.

¹²⁸ [REDACTED]

83. In a complex, technical environment, such as the PC or mobile device marketplace, where many different components are compiled to make a final product work, it is a common practice to specify if and how different components are compatible. Since components offered by different companies within a single final product have to be able to interoperate, companies need to provide ways of describing how those components relate to each other, even where there may be no formal business relationship between the component producers. For example, Microsoft states in its publicly available Trademark and Brand Guidelines that third-party app developers (who may program their apps to work with Microsoft’s various offerings) must keep “everything about [their] app [...] free of Microsoft’s Brand Assets. The only exception is that [they] may truthfully state whether [their] app is compatible or interoperable with a Microsoft product or service within the text description [of their] app.”¹²⁹
84. Arm’s own publicly available Trademark Use Guidelines¹³⁰ recognizes that third parties may need to refer to its technologies, as it explicitly instructs third parties to describe their products as “Arm-based” in order to accurately describe the relationship between the third-party technology and Arm’s technologies. In the “Referential use of Arm’s trademarks” section of its Trademark Use Guidelines, Arm instructs third parties that they “may refer

¹²⁹ “Microsoft Trademark and Brand Guidelines,” *Microsoft*, available at <https://www.microsoft.com/en-us/legal/intellectualproperty/trademarks>, accessed on February 12, 2024.

¹³⁰ I note that the Dhar Report refers to Arm’s Branding Guidelines, which apply only to holders of valid Arm trademark licenses, as both Branding Guidelines and Trademark Guidelines, without recognizing that Arm makes separate, publicly available Trademark Use Guidelines for non-licensee third parties. *See* Dhar Report, ¶¶ 51-52; ARM_01425245–252; QCARM_7517739–744. Therefore, any opinions offered in the Dhar Report based on the license-holder-relevant Branding Guidelines that speak to what Qualcomm should or should not have done with respect to Arm Trademarks while it did not hold an Arm license are unsupported.

to Arm-based products by using the word ‘-based’ between the relevant Arm trademark and the relevant third party product” and “may also indicate the relationship of [their] products and services to Arm’s products and services using accurate referential phrases.”¹³¹ These instructions thus provide a rubric that third parties, such as Qualcomm, can use to refer to Arm’s products and services in describing their own products and services without (falsely) signifying affiliation or approval between them.

85. In this case, third parties may need to describe their products or services as being compatible with Arm’s technologies. For example, software designers refer to their technology written to interoperate on Arm technologies as “Arm-based.”¹³² In fact, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] As Arm itself put it in its registration statement, the CPU instruction set is

¹³¹ QCARM_7517739–744 at 741-742.

¹³² See Deposition of Simon Segars, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146 (MN), United States District Court for the District of Delaware, November 16, 2023, pp. 39:25-40:6 (“Q. Okay. And when you say ‘Arm-based server chip,’ that’s a silicon chip for use in servers that would execute the Arm instruction set architecture, or ISA; right? A. Yes. Architecture does actually go beyond the instruction set architecture [...] but yeah.”). Even Arm’s own 2023 F-1 filing uses the term “Arm-based” in this manner. See ARM-01259705–0105 at 9825 (“Every CPU has an ISA, which defines the software instructions that can be executed by the CPU, essentially a common language for software developers to use. The ISA sets the foundation for a large library of compatible software which runs on those CPUs. As the Arm CPU is the most popular and pervasive CPU in history, the Arm ISA is also the most popular and pervasive ISA in history. **This means that Arm-based chips have a global community of software developers familiar with how to program the CPU.**” Emphasis added.).

¹³³ [REDACTED]

“essentially a common language for software developers to use.”¹³⁴ In order to build a product, software developers must know what language they’re speaking. Only by knowing which ISA a given piece of technology relies upon can developers reach into the “large library of compatible software which runs on those CPUs.”¹³⁵ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Moreover, Arm’s own corporate deponent, Jonathan Armstrong, Arm’s Head of Brand and Creative Services, testified in his deposition that he was not aware of any instance in which Arm had ever taken legal action based on third-party software designers that describe their software as “Arm-based.”¹³⁶

86. The Dhar Report cites to some industry articles and states, “industry press covering the technology at issue has used Arm’s brand to suggest endorsement, affiliation, or certification of the technology at issue by Arm.”¹³⁷ The Dhar Report does not provide any explanation or evidence that the audience of those news articles would interpret them as

¹³⁴ ARM_01259705–01015 at 9713 (“Every CPU has an ISA, which defines the software instructions that can be executed by the CPU, essentially a common language for software developers to use.”).

¹³⁵ ARM_01259705–01015 at 9825 (“The ISA sets the foundation for the large library of compatible software which runs on those CPUs.”).

¹³⁶ Armstrong Deposition, pp. 80:20-81:23 (“Q. Okay. Are you aware of any instances of Arm bringing an enforcement action in connection with the phrase ‘Arm-based’? A. I’m not aware. Q. So you don’t know whether Arm has brought an enforcement action related to a third party’s use of the term ‘Arm-based’? [] THE WITNESS: I do not know.” Objection omitted.).

¹³⁷ Dhar Report, ¶ 119.

suggesting “endorsement, affiliation, or certification” of the at-issue technology by Arm as the Dhar Report claims. Moreover, the cited articles, describing Qualcomm’s technology as Arm-based, appear to be focused toward a general readership for a technology-oriented audience. While the news articles might discuss certain technical information, the Dhar Report provides no basis for inferring (as it appears to do) that sophisticated industrial purchasers of Qualcomm’s products would rely entirely or in part on these news articles, rather than the technical specifications of the products, to make judgments about affiliation or sponsorship of Qualcomm’s products.

87. As previously stated in **Section V.B**, well-informed, specialist purchasers of Qualcomm’s products could be likely to view the term “Arm-based” as an indicator of the technical attributes of the chip, rather than any type of indicator of source. Though the Dhar Report contends the opposite to be true, it provides no evidence — including any surveys, interviews, or other data — to support its position. Moreover, the Dhar Report disregards the fact that industrial procurement departments are capable of testing the technical specifications of the parts that they consider purchasing, and therefore are highly unlikely to be confused regarding the attributes of the product when the performance or attributes of a chip they consider purchasing can be empirically verified.¹³⁸ To the extent that any of the few journalists (and one blogger) to which the Dhar Report cites used the term “Arm-based” to refer to the technical capabilities of Qualcomm’s products and not to identify sponsorship by Arm, the Dhar Report’s conclusion that “participants throughout the

¹³⁸



relevant industry are associating the Nuvia Products with Arm sponsorship”¹³⁹ would be incorrect. The Dhar Report does not present any scientific research necessary to support its conclusion that Qualcomm’s purported use of the Arm Trademarks have led to any costumer confusion, and as a result, the opinions offered therein are entirely unreliable.

D. The Dhar Report Presents No Evidence of Actual Confusion and Ignores Contradictions by Arm’s Own Admissions

88. Not only has Dr. Dhar not conducted any research to support his conclusion that Qualcomm’s purported use of the Arm Trademarks was likely to cause confusion among its customers, the Dhar Report also presents no evidence of *actual* confusion in any market — let alone the relevant B2B market discussed in **Section V.B.**
89. The Dhar Report both fails to cite, and is inconsistent with, the significant number of statements by Arm itself disclaiming knowledge or awareness of any actual customer confusion. For example, Arm has admitted that it is “not currently aware of any confusion, mistake, or deception related to Qualcomm’s use of ARM trademarks in connection with products originally developed under the Nuvia ALA[.]”¹⁴⁰ Similarly, Arm has admitted that “it is not currently aware of instances where a customer has expressed to Arm its confusion, mistake, or deception due to Qualcomm’s use of Arm trademarks in connection with products originally developed under the Nuvia ALA.”¹⁴¹

¹³⁹ Dhar Report, ¶ 120.

¹⁴⁰ Arm Ltd.’s Objections and Responses to Qualcomm’s Fourth Set of Interrogatories (Nos. 21-25), *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, November 17, 2023 (“Fourth Set of Interrogatories”), pp. 18-19.

¹⁴¹ Plaintiff Arm Ltd.’s Responses and Objections to Qualcomm’s First Requests for Admissions to Plaintiff (Nos. 1-30), *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, November 17, 2023 (“First Requests for Admissions to Plaintiff”), p. 14.

90. Moreover, Arm’s own corporate deponent, Jonathan Armstrong, Head of Brand Creative Services, stated several times in deposition that Arm did not have any knowledge of confusion among its customers, nor that it had taken any steps to remedy any perceived confusion. Mr. Armstrong testified that he did not know of *any* Arm customers who have been confused by Qualcomm’s use of the Arm Trademarks in relation to Qualcomm’s custom cores, and that Arm has no facts to suggest that any of its customers or Arm’s customers have been confused by Qualcomm’s press releases.¹⁴² Armstrong further testified that he was unaware of any factual basis for believing that Qualcomm’s blog posts using the phrase “Windows on Arm PCs powered by Snapdragon compute platforms” has given rise to any confusion concerning Arm Trademarks in connection with any Qualcomm product, nor has Arm contacted Qualcomm to ask it to remove this blog post since its publication in January 2022.¹⁴³ Armstrong also testified that, although he would have been

¹⁴² Armstrong Deposition, pp. 109:15-110:13 (“Q. Okay. Are you aware, as Arm’s corporate designee, that any customers have been confused about the source, sponsorship, or affiliation of any Qualcomm custom cores due to Qualcomm’s use of Arm’s marks? A. I’m not aware. Q. Okay. Has Arm conducted any surveys to determine whether any of its customers have been confused about the source, sponsorship, or affiliation of any Qualcomm custom cores due to Qualcomm’s use of Arm’s marks? A. I’m not aware of any surveys. Q. Has Arm conducted any interviews to determine whether any of its customers have been confused about the source, sponsorship, or affiliation of any Qualcomm custom cores due to Qualcomm’s use of Arm’s marks? A. I’m not aware. Q. Does Arm have any other facts suggesting that any of its customers have been confused about the source, sponsorship, or affiliation of any Qualcomm custom cores due to Qualcomm’s use of Arm’s marks? [] THE WITNESS: Not to my knowledge.” Objection omitted.).

¹⁴³ Armstrong Deposition, pp. 99:1-101:7 (“Q. Okay. I’ll represent to you it’s a copy of a Qualcomm press release titled ‘Qualcomm and leading compute partners build industry momentum for Windows on Arm PCs powered by Snapdragon compute platforms.’ It’s dated January 3, 2022. Are you related -- are you aware of any discussions within Arm about whether this press release constituted an improper use of the Arm mark? A. No. Q. Has Arm taken any actions to enforce its trademark rights with respect to this press release? A. I have no knowledge of that. Q. Do you have any awareness of whether this press release has given rise to any confusion concerning Arm’s mark in connection with Qualcomm’s products or services? [] THE WITNESS: I have no knowledge. [] Q. Has Arm ever contacted Qualcomm to ask it to take down this press release? [] Q. I’m asking you whether Arm has taken -- has contacted Qualcomm to ask it to take down this press release? A. I’m unaware. I do not know. Q. The press release was published on January 3, 2022. Since that date, has Qualcomm contact -- or has Arm contacted Qualcomm to ask it to correct this

notified in his role “[i]f something was going on outside of [a licensee’s] agreement and what was agreed with regards to a usage of those [Arm] marks,” he received no such notification “that Qualcomm had any use of the Arm logo or Arm word trademark that fell outside of the agreement and what was agreed with regards to a usage of Arm’s trademarks.”¹⁴⁴ Finally, Armstrong also testified that he was unaware of any instance, outside of the allegations of this lawsuit, in which Arm ever contacted Qualcomm to ask it to correct or remove a publicly available description of a Qualcomm custom core as “Arm-compatible,” “Arm-compliant,” or “Arm-based.”¹⁴⁵

91. The Dhar Report’s opinions that customers are being confused, or are highly likely to be confused, are unsupported by any evidence, empirical or otherwise, and cannot be relied upon.

press release? A. I have no knowledge of this. Q. Okay. And are you aware that this press release is still publicly available as of today’s date? A. I do not.” Objection omitted.).

¹⁴⁴ Armstrong Deposition, pp. 58:4-59:6 (“Q. Okay. Does Qualcomm use Arm’s word trademark in connection with any marketing or promotion associated with the Qualcomm [REDACTED] CPU? A. I don’t have knowledge of that. Q. Okay. And would you expect to be informed of that in connection with your role as head of brand and creative services? A. If something was going on outside of the agreement and what was agreed with regards to a usage of those marks, then I would be notified. Q. But you have not received any such notification? A. I’m not aware. Q. You’re not aware as in you have not received any such notification, to your recollection? [] THE WITNESS: Yeah, I’m not aware. [] Q. Mr. Armstrong, just to clarify, you have not received any notification, to your recollection, that Qualcomm had any use of the Arm logo or Arm word trademark that fell outside of the agreement and what was agreed with regards to a usage of Arm’s trademarks, correct? A. Correct.” Objection omitted.).

¹⁴⁵ Armstrong Deposition, p. 104:4-18 (“Q. Outside of allegations in this lawsuit, has Arm ever contacted Qualcomm to ask it to correct or remove a publicly available description of a Qualcomm custom core as ‘Arm-based’? A. I don’t know. Q. Okay. Outside of allegations in this lawsuit, has Arm ever contacted Qualcomm to ask it to correct or remove a publicly available description of a Qualcomm custom core as ‘Arm-compliant’? A. I don’t know. Q. Outside of allegations in this lawsuit, has Arm ever contacted Qualcomm to ask it to correct or remove a publicly available description of a Qualcomm custom core as ‘Arm-compatible’? A. I don’t know.”).

VI. THE DHAR REPORT’S CONCLUSIONS ON HARM TO THE ARM BRAND ARE SPECULATIVE AND DO NOT EXPLAIN THE MECHANISM BY WHICH HARM WOULD OCCUR

92. The Dhar Report makes speculative, forward-looking, and unsupported statements on purported harm from Qualcomm’s purportedly unauthorized use of the Arm Trademarks. In particular, the Dhar Report makes generic statements about harm to the Arm brand,¹⁴⁶ diversion of sales from authorized users of Arm Trademarks,¹⁴⁷ and loss of benefits by Nuvia’s customers.¹⁴⁸ These statements are based on speculative theory and are untethered to the facts put forward in this matter. Moreover, the Dhar Report does not discuss in concrete detail how the purported harm would arise in the relevant market. To the extent the Dhar Report does articulate any theory of harm, the theories are unsupported and speculative.

¹⁴⁶ Dhar Report, ¶¶ 127-128 (“Qualcomm’s unlicensed use of Arm’s Trademarks will cause harm to Arm by resulting in a loss of control to Arm of its brand and goodwill. In general, the loss of brand image and goodwill occurs because any dissatisfaction or problems associated with the infringing user, or its products are likely to be erroneously attributed also to the trademark owner and/or its products. Negative attributions and inferences concerning the infringing user, or its products can also spillover to Arm if it is seen as being associated with such products. [...] Qualcomm’s unauthorized use of Arm’s Trademarks means that how customers view the Arm Mark is now connected to the quality and outcomes associated with the Nuvia Products.”).

¹⁴⁷ Dhar Report, ¶ 132 (“Qualcomm’s unauthorized use of Arm’s Trademark in connection with the Nuvia Products will likely divert sales from authorized users of Arm’s Trademark (e.g., Arm’s customers whose products are covered by a valid license with Arm).”).

¹⁴⁸ Dhar Report, ¶ 133 (“Customers of Nuvia Products themselves would be harmed by the deceptive nature of the sale and the loss of benefits they sought from using Arm’s products.”).

A. The Dhar Report’s Conclusion About Harm to the Arm Brand’s Image and Goodwill Is Speculative and Unsupported

93. The Dhar Report contends that “Qualcomm’s unlicensed use of Arm’s Trademarks will cause harm to Arm by resulting in a loss of control to Arm of its brand and goodwill.”¹⁴⁹ However, beyond such generic statements that merely explain the general concept of loss of brand image and goodwill, the Dhar Report does not precisely define or otherwise specify what that harm is and how that harm would occur in this specific context. Moreover, the Dhar Report does not provide valid evidence for this assertion and ignores evidence in this litigation that actually suggests the opposite, that the Arm brand has not been and is unlikely to be harmed.
94. The Dhar Report states that “[i]n general, the loss of brand image and goodwill occurs because any dissatisfaction or problems associated with the infringing user, or its products are likely to be erroneously attributed also to the trademark owner and/or its products. Negative attributions and inferences concerning the infringing user, or its products can also spillover to Arm if it is seen as being associated with such products.”¹⁵⁰ As with its analysis of customer confusion, the Dhar Report does not specify who would attribute these problems to Arm, nor who would associate Arm with Nuvia’s products in this case. Nor does the Dhar Report offer evidence that there would be such “[n]egative attributions and inferences” spilling over to Arm.¹⁵¹

¹⁴⁹ Dhar Report, ¶ 127.

¹⁵⁰ Dhar Report, ¶ 127.

¹⁵¹ Dhar Report, ¶ 127.

95. In fact, the Dhar Report has not put forward *any* empirical evidence to suggest that there would be an effect on the goodwill or brand image of the Arm brand as a result of the purported, at-issue trademark infringement.¹⁵² The only evidence the Dhar Report cites in support of its assertion that harm is likely is deposition testimony from Will Abbey, Arm’s Executive VP and Chief Commercial Officer, who is not a neutral party. Mr. Abbey testified to his *belief* that “a partner that continues to use Arm confidential information without a contract is – damages our brand and damages our reputation,”¹⁵³ but did not provide any support for his testimony.¹⁵⁴
96. Critically, the Dhar Report ignores evidence in the record contrary to his conclusion, including deposition testimony from Arm’s own witnesses stating that they were unaware of any actual harm to Arm, including from loss of goodwill or purported consumer confusion in connection with Arm Trademarks. For example:

¹⁵² Moreover, a form of empirical analysis employing survey evidence is “virtually demand[ed]” in cases alleging violations of the Lanham Act. *See* Diamond, Shari S., “Reference Guide on Survey Research,” in *Reference Manual on Scientific Evidence*, Third Edition, National Academies Press, 2011, pp. 359-423 (“Diamond (2011)”), p. 366 (“A routine use of surveys in federal courts occurs in Lanham Act cases, when the plaintiff alleges trademark infringement or claims that false advertising has confused or deceived consumers. **The pivotal legal question in such cases virtually demands survey research because it centers on consumer perception and memory[.]**” (emphasis added)). *See also* Diamond (2011), pp. 364-365 (“The inquiry under Rule 703 focuses on whether facts or data are ‘of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject.’ ... Because the survey method provides an economical and systematic way to gather information and draw inferences about a large number of individuals or other units, surveys are used widely in business, government, and, increasingly, administrative settings and judicial proceedings.”).

¹⁵³ Abbey Deposition, p. 324:2-8 (“A. The – the end result is a contract. At the end of the day, Arm’s an IP company. Our confidential information, our intellectual property is so germane to what we do. And a partner that continues to use Arm confidential information without a contract is – damages our brand and damages our reputation.”).

¹⁵⁴ Additionally, I understand that there is a dispute in the case as to whether Qualcomm is using Arm confidential information without a contract, and that Qualcomm’s position is that it is not.

- a. Mr. Abbey’s testimony is directly contradicted by that of Jonathan Armstrong, Arm’s Head of Brand and Creative Services, who testified in his capacity as corporate designee that he was not aware of any Arm partners or customers telling Arm that they value Arm Trademarks differently as a result of Qualcomm’s use of Arm’s word mark, nor was he aware of any Arm customers or licensees taking the view that they do not need to follow Arm Trademark Use Guidelines or Branding Guidelines because of Qualcomm’s actions in connection with this lawsuit.¹⁵⁵
- b. Moreover, Mr. Abbey himself testified that (1) Arm customers have not expressed an intent to terminate their TLAs with Arm to use Qualcomm-produced products, (2) none of Arm’s customers have breached their contracts with Arm, and (3) Arm has not lost any contracts as a result of the acquisition of Nuvia.¹⁵⁶
- c. Additionally, Arm has admitted that “it is not currently aware of instances since the filing of the Complaint where an ARM licensee or partner has breached its license agreements with ARM citing Qualcomm’s alleged breach of Qualcomm’s license agreements with ARM.”¹⁵⁷
- d. Arm also admitted “that it is not currently aware of instances where a customer or partner has asserted that Qualcomm’s use of ARM trademarks in connection with

¹⁵⁵ Armstrong Deposition, p. 118:11-23 (“Q. Okay. As your – in your capacity as corporate designee, are you aware of any Arm partners or customers telling Arm that they value Arm’s trademarks differently as a result of Qualcomm’s use of Arm’s work mark? A. No, not aware. Q. In your role as Arm’s corporate designee, are you aware of any Arm customers or licensees taking the view that they do not need to follow Arm’s Trademark Use Guidelines or Branding Guidelines because of Qualcomm’s actions in connection with this lawsuit? A. No.”).

¹⁵⁶ Abbey Deposition, pp. 365:17-367:17.

¹⁵⁷ First Requests for Admissions to Plaintiff, p. 15.

products previously under development pursuant to the Nuvia ALA damaged ARM’s reputation.”¹⁵⁸

e. Finally, Arm’s CEO also testified that Arm has not suffered *any* “concrete harm.”¹⁵⁹

97. Consequently, the only evidence that the Dhar Report provides in support of purported harm to Arm (i.e., a citation from Mr. Abbey) is contradicted by further testimony from the same and other Arm witnesses, as well as by Arm’s own admissions in this litigation. As such, the Dhar Report’s one piece of evidence on its theory of harm is unreliable and leaves the theory largely unsupported.

98. The Dhar Report further states “Qualcomm’s unauthorized use of Arm’s Trademarks means that how customers view the Arm Mark is now connected to the quality and outcomes associated with the Nuvia products,”¹⁶⁰ and that any potential negative customer experience with the Nuvia Products could “place Arm’s valuable brand asset at risk.”¹⁶¹ This assertion is also speculative, forward-looking, and unsupported. The Dhar Report fails to analyze or describe whether and how the purported negative product features that Nuvia customers may experience would be attributed to Arm. This is a major shortcoming in the Dhar Report because this purported attribution occurs within a technologically sophisticated business-to-business customer base as discussed in **Section V.B.**

¹⁵⁸ First Requests for Admissions to Plaintiff, p. 16.

¹⁵⁹ Deposition of Rene Haas, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146 (MN), United States District Court for the District of Delaware, December 12, 2023 (“Haas Deposition”), pp. 165:24-166:5 (“Q. Okay. And sitting here today, what – what concrete harm has Arm suffered? A. What concrete harm – Q. Yes. A. – that we have suffered? Q. Yes. A. Nothing yet.”).

¹⁶⁰ Dhar Report, ¶ 128.

¹⁶¹ Dhar Report, ¶ 128.

99. Notably, the Dhar Report fails to point to any evidence that such negative experiences with Qualcomm products have occurred or are likely to occur. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. For instance:

a. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

162

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

164

[REDACTED]

■

[REDACTED]

■

[REDACTED]

f. [REDACTED]

g. Further, October 2023 industry reporting from Qualcomm’s Snapdragon Summit suggested that Qualcomm’s newly unveiled “Snapdragon X Elite platform built on the [Nuvia-based] [REDACTED] processor... easily beat[] the Apple MacBook Pro 13” with an M2 processor and Razer’s Blade 15 (2023)” in a benchmarking session conducted for reporters.¹⁶⁸ Another reporter at *Windows Central* noted that “[p]ound-for-pound, the

[REDACTED]

[REDACTED]

¹⁶⁸ Rubino, Daniel, “Qualcomm Brings Receipts: Snapdragon X Elite Gets Benchmarked, Completely Dunks on Apple’s M2 Processor,” *Windows Central*, October 30, 2023, available at

Snapdragon X platform powered by the Qualcomm [REDACTED] CPU can take on and beat Apple’s M series chips at its own game.”¹⁶⁹

h. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

<https://www.windowcentral.com/hardware/laptops/qualcomm-brings-the-receipts-snapdragon-x-elite-gets-benchmarked-proves-it-beats-apples-m2-processor>. [REDACTED]

[REDACTED] See also Deposition of Paul Williamson, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146 (MN), United States District Court for the District of Delaware, November 9, 2023, p. 220:4-8 (“If [Apple] were successful in continuing to outpace ARM’s own implementation cores, it could suggest a market consolidation towards Apple and towards iOS, which might produce innovation opportunity within the market.”); Haas Deposition, p. 320:8-24 (confirming that Apple only has an ALA with Arm, not a TLA); Haas Deposition, p. 254:12-17 (“One of the things Samsung was really, really quite keen on was how to compete against Apple, because perception was that Apple was setting the gold standard for performance.”); Haas Deposition p. 313:1-6 (“So again, the -- the purpose -- the purpose of this deck was to indicate to Samsung how we were going to catch Apple. And one of the things we pointed out was Android ecosystem losing out to iOS.”).

¹⁶⁹ Devine, Richard, “Windows Finally Has Its Apple Mac Moment, and I’m More Excited About the Future of Laptops Than Ever Before,” *Windows Central*, October 25, 2023, available at <https://www.windowcentral.com/hardware/laptops/windows-has-its-mac-moment-more-excited-about-the-future-of-laptops-than-ever>.

¹⁷⁰ [REDACTED] See also Moorhead, Patrick, “Research Note: Arm’s ‘Blackhawk’ CPU Is An Audacious Plan To Have The Best Smartphone CPU Core This Year,” *Moor Insights & Strategy*, January 8, 2024, available at <https://moorinsightsstrategy.com/research-notes/research-note-arms-blackhawk-cpu-is-an-audacious-plan-to-have-the-best-smartphone-cpu-core-this-year/> (“‘Blackhawk’ is Arm’s next-generation Cortex-X processor, which Arm plans to enable in smartphones shipping at the end of 2024. [...] I am told that this is part of Arm CEO Rene Haas’s strategy to ‘eliminate the performance gap between Arm-designed processors and custom Arm implementations.’ This is a big and bold claim because it is so difficult, and Apple has run the table for so long. [...] While Arm holds the ISA cards, winning the CPU wars falls on the backs of architects and its developers, who, to this point,

100. The Dhar Report fails to offer any coherent or supported explanation of harm to the Arm brand as a result of Qualcomm’s purportedly infringing use of the Arm Trademarks. Other than generic statements about Arm’s loss of control over its brand image and goodwill, the Dhar Report does not clarify how that image could be affected by Qualcomm’s use of the Arm Trademarks in the relevant sophisticated B2B market. In addition to failing to provide concrete support for its generic statements, the Dhar Report also fails to consider relevant evidence that suggests such harm is unlikely to happen in the context of this litigation.

B. The Dhar Report’s Claim About Purported Harm to Arm Through Diversion of Sales Is Overly Simplistic, Speculative, and Unsupported

101. The Dhar Report states that “Qualcomm’s unauthorized use of Arm’s Trademark in connection with the Nuvia Products will likely divert sales from authorized users of Arm’s Trademark (e.g., Arm’s customers whose products are covered by a valid license with Arm)[,]” because they “mistakenly understand [...] that Qualcomm’s Nuvia Products are equivalent to Arm technology, or somehow supported by Arm.”¹⁷¹ However, the Dhar Report does not provide any concrete description of how or evidence of whether customers would develop this “mistaken[] understand[ing]” in the sophisticated B2B market in which Qualcomm and other Arm licensees compete. Further, the Dhar Report also does not

haven’t been able to achieve CPU performance supremacy versus Apple.”); Robinson, Dan, “Arm Cooking Up Powerful Cortex-X CPU to Beat iPhone Performance, Says Industry Watcher,” *The Register*, January 11, 2024, available at https://www.theregister.com/2024/01/11/arm_cooking_up_powerful_cortexx/ (“Arm has confirmed it is working on a CPU core expected to deliver a jump in performance, thus taking aim at the closing the gap between its own chips and those produced by Apple... This rivalry exists because Apple has designed its own chips that have made the iPhone models pack a performance punch compared with Android devices, which typically run on chips built around Arm’s pre-validated core designs.”).

¹⁷¹ Dhar Report, ¶ 132.

describe or provide evidence for whether or how this “mistaken[] understand[ing]” would itself cause sales to be diverted from authorized users of Arm Trademarks.

102. The only explanations that the Dhar Report provides for this purported shift are the unsupported theory that customers “may select a Nuvia Product rather than an Arm product or an Arm licensed product, understanding mistakenly that they are interchangeable”¹⁷² and the similarly unsupported claim that “[t]he use of the familiar and trusted Arm brand will enable Qualcomm to communicate that the Nuvia Products are licensed and have been verified and validated by Arm, thereby facilitating acceptance and adoption of such products[.]”¹⁷³ These statements are overly simplistic and unsupported by valid evidence, and also fail to consider the sophisticated and informed nature of the B2B purchases as discussed earlier in **Section V.B.** Indeed, the Dhar Report’s assessment is perhaps more akin to a simple consumer purchase decision (e.g., a consumer in the general population buying a much simpler product on a supermarket shelf due to claims on the packaging), and is wholly unsupported by any scientific analysis, methodology, or study.

103. In addition, the Dhar Report’s assertion that customers “may select a Nuvia Product rather than an Arm product or an Arm licensed product” because they may mistakenly believe these products are “interchangeable” completely ignores the value that Qualcomm and other Arm licensees add to the final product. Instead, the Dhar Report simply assumes without support that a primary reason customers purchase these products is because of their use of Arm technology. This assumption is baseless especially because Qualcomm and

¹⁷² Dhar Report, ¶ 16.

¹⁷³ Dhar Report, ¶ 126.

other Arm licensees are the entities that (1) ultimately make the final product (or have them made by a third-party), and (2) design, produce, and market the product into which the chip is a component.

104. Despite hypothesizing about potential diversion of sales from Arm licensees to Qualcomm, the Dhar Report fails to provide evidence that such diversion of sales would be likely to actually occur. The Dhar Report’s simplistic description of the process through which Arm could be harmed by purported diversion of sales from Arm licensees to Qualcomm is purely speculative, unsupported, and fails to consider the sophistication of the decision-makers in the relevant marketplace, as described in **Section V.B.**

C. The Dhar Report Offers No Evidence for Its Claim That Nuvia Customers Would Be Harmed as a Result of Qualcomm’s Use of Arm Trademarks

105. The Dhar Report states that “[c]ustomers of Nuvia Products themselves would be harmed by the deceptive nature of the sale and the loss of benefits they sought from using Arm’s products.”¹⁷⁴ However, the Dhar Report offers no evidence that such deception would occur or even that it is likely to occur. As discussed above in **Section V.B** the Dhar Report ignores the fact that Qualcomm and Nuvia’s customers are sophisticated industrial purchasers that make informed purchase decisions and thus ignores the implication that they are likely to be aware of the nature of Qualcomm’s custom cores.¹⁷⁵ Finally, the Dhar Report’s claim that Nuvia customers would be deceived and harmed by not receiving

¹⁷⁴ Dhar Report, ¶ 133.

¹⁷⁵ *See, e.g.*, Dhar Report, ¶¶ 93-97.

Arm’s “unique benefits” such as the “support and maintenance from Arm engineers” is vague and unsupported by evidence of such deception.¹⁷⁶

106. First, the Dhar Report fails to establish that potential purchasers of Nuvia products would be deceived about the nature or benefits of the chips they are purchasing, including whether Qualcomm has a license with Arm. The Dhar Report does not cite any actual evidence that any Qualcomm customer has obtained or is likely to obtain a product they would not expect, or that any Qualcomm customer would complain to either Qualcomm or Arm about a Nuvia product they purchase. The Dhar Report also does not offer any empirical evidence that, going forward, Qualcomm customers are likely to be deceived.

107. Second, the Dhar Report again fails to acknowledge the sophisticated nature of Qualcomm’s chip purchasers (as discussed in **Section V.B**), which makes these customers highly likely to understand and appreciate the precise benefits they are receiving in connection with a major purchase, such as SOCs that include multiple technologies. Moreover, Arm’s litigation with Qualcomm has been covered in the news.¹⁷⁷ The Dhar Report has not provided any support for the idea that Qualcomm’s customers in

¹⁷⁶ Moreover, the Dhar Report offers no evidence that Arm provides “support and maintenance” to Nuvia customers.

¹⁷⁷ See, e.g., Lee, Leonard, “Arm-Qualcomm Lawsuit Could Muddle US Chip Design Leadership,” *Bloomberg Law*, June 13, 2023, available at <https://news.bloomberglaw.com/us-law-week/arm-qualcomm-lawsuit-could-muddle-us-chip-design-leadership>; Leswing, Kif, “Why Arm’s Lawsuit Against Qualcomm Is a Big Deal,” *CNBC*, September 1, 2022, available at <https://www.cnbc.com/2022/09/01/why-arms-lawsuit-against-qualcomm-is-a-big-deal.html>; Clark, Mitchell, “Qualcomm’s Server and Laptop Ambitions May Be in Trouble,” *The Verge*, August 31, 2022, available at <https://www.theverge.com/2022/8/31/23331493/arm-qualcomm-nuvia-lawsuit-architecture-license-servers-desktops>.

sophisticated procurement departments would be unaware of Arm’s lawsuit or Arm’s allegations about the custom cores, and the potential loss to them of potential Arm benefits, if any.

108. Third, the Dhar Report asserts that “[c]ustomers seeking to use an Arm product who instead receive a Qualcomm product are harmed and deceived by getting a product that is not in fact sponsored by or affiliated with Arm, and does not come with the unique benefits, like the support and maintenance from Arm engineers, that a true partnership with Arm would bring.”¹⁷⁸ The Dhar Report does not clarify how “unique benefits, like the support and maintenance from Arm engineers” would accrue to those Qualcomm’s customers who the Dhar Report alleges would be deceived. [REDACTED]

[REDACTED]

[REDACTED] Further, the Dhar Report does not provide any evidence that customers who would purchase Qualcomm products under the assumption that the products are “Arm-based” would therefore have an expectation of receiving this type of customer service from Arm.

109. The Dhar Report fails to provide any reasonable support for the opinion that Nuvia customers would be harmed by Qualcomm’s purported use of Arm Trademarks, overlooks

¹⁷⁸ Dhar Report, ¶ 133.

¹⁷⁹ [REDACTED]

the complexities of B2B procurement, and makes unclear statements about Arm’s “unique benefits” that Nuvia customers seek.

VII. THE DHAR REPORT’S ANALYSIS OF FAIR USE IS SPECULATIVE AND INCOMPLETE

110. The Dhar Report states that “to demonstrate fair use, Qualcomm must show (1) that its unauthorized use of the ARM Trademarks is necessary to describe both ARM’s product or service and Qualcomm’s product or service; (2) that Qualcomm uses only so much of the ARM Trademarks as is necessary to describe ARM’s product; and (3) that Qualcomm’s conduct or language reflects the true and accurate relationship between Arm’s and Qualcomm’s products or services.”¹⁸⁰ The Dhar Report opines that “Qualcomm’s unauthorized use of the Arm Trademarks would not constitute fair use[.]”¹⁸¹ although it states further that it has “not conducted a full analysis on why Qualcomm’s unauthorized use of the Arm Trademarks would not constitute fair use[.]”¹⁸²
111. The test Dr. Dhar relies on in evaluating fair use appears to be a reference to what I understand to be a three-part test to judge the “fairness” of referential use of trademarks used by courts, which asks (1) whether the use of the plaintiffs’ mark is necessary to describe the plaintiff’s product or service and the defendant’s product or service, (2) whether only so much of the plaintiff’s mark is used as is necessary to describe the plaintiff’s product or service, and (3) whether the defendant’s conduct or language reflects

¹⁸⁰ Dhar Report, ¶ 135.

¹⁸¹ Dhar Report, ¶ 136.

¹⁸² Dhar Report, ¶ 137.

the true and accurate relationship between the plaintiff and the defendant’s products or services.¹⁸³

112. Whether a particular use constitutes “fair use” strikes me as a legal question to be evaluated by a court. Nonetheless, I will address the Dhar Report and Dr. Dhar’s fair use opinion based on my experience as a marketing professor and not as a substitute for the judgment of the court.
113. *First*, Dr. Dhar’s analysis is incomplete and speculative. In lieu of a “full analysis,” the Dhar Report merely relies on its previous unsupported conclusion that “particular phrases such as ‘Arm-based’ and ‘Arm compliant’ falsely signif[y] that the Nuvia Products have been connection [sic] as to source, affiliation, sponsorship, or approval from Arm and have been verified and validated by Arm and that the Nuvia Products are covered by an applicable license to Arm Technology.”¹⁸⁴ Specifically, the Dhar Report asserts that Qualcomm’s use of the Arm Trademarks “would *not* reflect the true and accurate relationship between Arm and Qualcomm’s Nuvia-based Products” (emphasis in original) for two reasons: (1) “there is no licensing relationship between Arm and Qualcomm with respect to the Nuvia Products” and (2) “the Nuvia-based Products have not gone through a verification and validation process with Arm’s support and maintenance in order to comply with Arm’s ISA requirements.”¹⁸⁵

¹⁸³ “Fair Use of Trademarks (Intended for a Non-Legal Audience),” *International Trademark Association*, December 16, 2020, available at <https://www.inta.org/fact-sheets/fair-use-of-trademarks-intended-for-a-non-legal-audience/>.

¹⁸⁴ Dhar Report, ¶ 136.

¹⁸⁵ Dhar Report, ¶ 136.

114. *Second*, As discussed in **Section V.C** above, the Dhar Report consistently overlooks and ignores that Qualcomm uses the Arm Trademarks in connection with its custom cores *referentially* to describe its products’ technical attributes. Although the Dhar Report purports to state that Qualcomm has no license with Arm covering the custom cores (which I understand Qualcomm disputes),¹⁸⁶ even if this were the case, the Dhar Report does not explain how this renders any description of the custom cores as “Arm-based,” “Arm-compliant,” or “Arm-compatible” to be factually inaccurate, nor does the Dhar Report offer any evidence that relevant customers would take away an inaccurate understanding of the relationship between Qualcomm and Arm from these terms.¹⁸⁷
115. As noted above, I understand Qualcomm’s description to be factually accurate because the statement describes that Qualcomm’s cores are compatible with the Arm ISA — a fact I understand is not in dispute. Therefore, because the Dhar Report provides no empirical evidence that Qualcomm’s factually accurate statements about its custom cores would cause relevant customers to take away an inaccurate understanding of the relationship between Arm and Qualcomm, it does not demonstrate that Qualcomm’s purported use of the Arm Trademark fails the third step of his test.
116. *Third*, the Dhar Report fails to consider or discuss the two other factors it lists as relevant, including whether Qualcomm’s descriptions of its custom cores as “Arm-based,” “Arm-

¹⁸⁶ I understand that Qualcomm contends that the ALA “is intended to encourage licensees to develop their own CPU core technology with their own innovations, at their own risk and expense and for their own benefit,” and that “Qualcomm can, under the ALA, design, manufacture, and distribute Qualcomm’s custom ARM-compatible CPU cores.” Defendants’ Amended Answer, ¶¶ 43, 183.

¹⁸⁷

[REDACTED]

compliant,” or “Arm-compatible” are necessary to accurately identify the custom cores’ technical attributes and whether it uses the Arm mark only to the degree necessary to do that.¹⁸⁸

117. As discussed above, I understand that software engineers and others in the industry need to understand the ISA with which the Qualcomm products are compatible in order to determine whether and how other products will work with Qualcomm’s.¹⁸⁹ Accordingly, it is necessary to describe Qualcomm cores as “Arm-based,” “Arm-compliant,” or “Arm-compatible.” Arm itself seems to recognize this, given that its own Trademark Use Guidelines acknowledge that third parties may need to refer to the relationship between their products and Arm technologies and further instruct those parties to describe their products as “Arm-based.”¹⁹⁰

118. Based upon the examples the Dhar Report has offered, it also appears that Qualcomm uses the Arm Trademarks to a minimal degree: as discussed above, the Dhar Report cites to only two examples of public descriptions by Qualcomm about its Nuvia-based custom core technologies that refer to the Arm Trademarks.¹⁹¹ The Dhar Report offers no other evidence

¹⁸⁸ Dhar Report, ¶ 135.

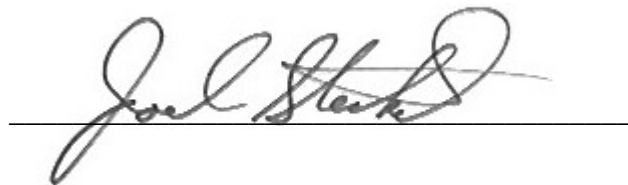
¹⁸⁹ [REDACTED]

¹⁹⁰ QCARM_7517739–744 at 741-742.

¹⁹¹ I note the Dhar Report cites three sources relating to Qualcomm’s current use of the Arm Trademarks. However, because the first of the three, a Qualcomm press release published on January 3, 2022 stating there is “broad support from ecosystem partners for the PC industry’s transition to Arm®-based computing,” and that Qualcomm’s “acquisition of NUVIA uniquely positions Qualcomm Technologies to drive this industry wide transition,” was published prior to the announcement of Qualcomm’s first custom core (the Qualcomm [REDACTED] Custom Core), it is therefore more accurately considered a historical use of the Arm Trademark. I further note that the Dhar Report cites a press release that was published *after* the

of marketing or branding of those technologies that makes more expansive use of the Arm Trademarks.

119. Because the Dhar Report does not factually support its assertions that Qualcomm’s purported use of the Arm Trademarks in connection with Qualcomm’s custom cores was and is inaccurate, its logic does little more than assume the conclusion.

A handwritten signature in black ink, reading "Joel H. Steckel", is written over a horizontal line.

Joel H. Steckel

February 27, 2024

January 3, 2022 press release as a *historical* use of the Arm Trademark, which further supports its classification as also an instance of historical use. *See* Dhar Report, ¶¶ 112(a), 111.

APPENDIX A
CURRICULUM VITAE

JOEL HOWARD STECKEL
New York University
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EDUCATION

UNIVERSITY OF PENNSYLVANIA, THE WHARTON SCHOOL

Doctor of Philosophy Degree (Marketing/Statistics) awarded, May 1982.
Dissertation Title: "A Game Theoretic and Experimental Approach to the Group Choice Phenomenon in Organizational Buying Behavior;" Professor Yoram Wind, advisor.

Master of Arts Degree (Statistics) awarded May 1980.

Master of Business Administration Degree (Management Science) awarded with Distinction, May 1979.

Elected to Beta Gamma Sigma, May 1979.

COLUMBIA UNIVERSITY

Bachelor of Arts (Mathematics) awarded Summa Cum Laude, May 1977.

Elected to Phi Beta Kappa, May 1977.

ACADEMIC POSITIONS

Visiting Scholar, University of Pennsylvania Carey Law School, September 1 2022 – August 2023.

Vice Dean for Doctoral Education, Stern School of Business, New York University, August 2012-August 2021.

Accounting Department, Acting Chairperson, Stern School of Business, August 2016 – August 2019.

Director PhD Programs, Stern School of Business, New York University, May 2007-July 2012.

Marketing Department Chairperson, Stern School of Business, New York University, July 1998-June 2004.

Professor and Associate Professor, Stern School of Business, New York University, January 1989 - present. Taught courses in Business Strategy, Marketing Management, Marketing Research, Corporate Reputation and Branding, Models of Pricing and Promotion, Field Studies in the New Economy, Marketing Engineering, and Analytic Marketing for Management Consulting. Also

taught Doctoral Seminars in Mathematical Models in Marketing and Behavioral Research Methods.

Visiting Professor, Wharton School, University of Pennsylvania, January 1995 - December 1995. Taught Core Marketing course.

Visiting Professor, Escola de Pós-Graduação em Ciências Económicas e Empresariais, Universidade Católica Portuguesa, May - June 1992, May - June 1993. Taught Industrial Marketing and Marketing Strategy.

Associate Professor and Assistant Professor, Graduate School of Business, Columbia University, July 1981 - December 1988. Taught MBA-level courses in Industrial Marketing, Marketing Planning, and Marketing Research. Taught three Ph.D.-level Marketing Seminars and Applied Multivariate Statistics.

Visiting Associate Professor, School of Organization and Management, Yale University, September - December 1988. Taught graduate course in Marketing Strategy.

Visiting Assistant and Associate Professor, Graduate School of Management, University of California at Los Angeles, July 1984 - June 1985, January - March 1987. Taught Advanced Marketing Management, Marketing Research, and Strategic Marketing Planning.

Assistant Instructor, Department of Statistics, University of Pennsylvania, July 1979 - June 1980. Assisted in undergraduate and MBA-level courses in Statistics. Taught undergraduate course in Calculus.

Teaching Assistant, Department of Mathematics, Columbia University, September 1976 - May 1977. Assisted in courses in Number Theory and Differential Equations.

PROFESSIONAL INTERESTS

Marketing Strategy and Marketing Research. In particular, marketing research methodology, marketing and branding strategies, digital marketing, legal aspects of marketing, and managerial decision making.

PUBLICATIONS

Books

Legal Aspects of Marketing Theory (ed. with J. Gersen), New York: Cambridge University Press, 2023.

Shift Ahead: How the Best Companies Stay Relevant in a Changing World (with A. Adamson), New York: AMACOM, 2018.

Marketing Research (with D. Lehmann and S. Gupta), Boston: Addison-Wesley Longman, 1998.

Analysis for Strategic Marketing (with V. Rao), Boston: Addison-Wesley Longman, 1998.

The New Science of Marketing: State of the Art Tools for Anticipating and Tracking the Market Forces that will Shape Your Company's Future (with V. Rao), Chicago: Irwin Professional Publishers, 1995.

Journal Articles

“Incorporating Uncertainty in Trademark Surveys: Do Respondents Really Know What They Are Talking About?,” (with B. Beebe, R. Germano, and C. Sprigman), The Trademark Reporter, Forthcoming.

“Consumer Uncertainty in Trademark Law,” (with B. Beebe, R. Germano, and C. Sprigman), Emory Law Journal, Vol. 72, Issue 3, 2023, 487-546.

“Clearing Up Some Confusion about Dilution: A Reply to Hal Poret,” The Trademark Reporter, Vol. 112, 2022, 684ff.

“The Science of Proving Trademark Dilution,” (with B. Beebe, R. Germano, and C. Sprigman), The Trademark Reporter, Vol. 110, November-December 2019.

“Testing for Trademark Dilution in the Court and Lab,” (with B. Beebe, R. Germano, and C. Sprigman), University of Chicago Law Review, Vol 86, May 2019.

“The Future of Marketing Letters,” (with P. Golder and S. Jap), Marketing Letters, Vol. 29, No. 3, September, 2017, 1-5.

“Behavioral Reasons for New Product Failure: Does Overconfidence Induce Over-forecasts?” (with D. Markovitch, A/ Michaut-Denizeau, D. Philip, and W. M. Tracy), Journal of Product Innovation Management, Vol. 32, No. 5, September 2015.

“Modeling Credit Card Share of Wallet: Solving the Incomplete Information Problem,” (with Y. Chen), Journal of Marketing Research, Vol. 49, No. 5, October 2012.

“The Role of Consumer Surveys in Trademark Infringement: Evidence From the Federal Courts,” (with R. Bird), University of Pennsylvania Journal of Business Law, Vol. 14, Issue 4, Summer 2012, 1013-1054.

“Do Initial Stock Price Reactions Provide a Good Measurement Stick for Marketing Strategies? The Case of Major New Product Introductions in the US” (with D. Markovich), European Journal of Marketing, Vol. 46, Iss. 3, 2012, 406-421.

“When Do Purchase Intentions Predict Sales?” (with V. Morwitz and A. Gupta), International Journal of Forecasting, Vol. 23, November 2007, 347-64.

“Dilution through the Looking Glass: A Marketing View of the Trademark Dilution Revision Act of 2005,” (with R. Klein and S. Schussheim), The Trademark Reporter, Vol. 96, No. 3, May-June 2006.

“Choice in Interactive Environments,” (with R. Winer, R. Bucklin, B. Dellaert, X. Drèze, G. Häubl, S. Jap, J.D.C. Little, T. Meyvis, A. Montgomery, and A. Rangaswamy), Marketing Letters, Vol. 16, No.3/4, 2005.

“Using Capital Markets as Market Intelligence: Evidence from the Pharmaceutical Industry,” (with D. Markovich and B. Yeung), Management Science, October 2005.

“Marketing Science – Growth and Evolution,” (with J. Hauser, G. Allenby, F.H. Murphy, J.S. Raju, and R. Staelin), Marketing Science, Vol. 24, No. 1, Winter 2005.

“Supply Chain Decision Making: Will Shorter Cycle Times and Shared Point of Sale Information Necessarily Help?,” (with S. Gupta and A. Banerji), Management Science, Vol. 50, No. 4, April 2004.

“Choice and the Internet: From Clickstream to Research Stream,” (with R. Bucklin, J. Lattin, A. Ansari, S. Gupta, D. Bell, E. Coupey, J.D.C. Little, C. Mela, and A. Montgomery), Marketing Letters, Vol. 13, No. 3, Summer 2002.

“A Multiple Ideal Point Model: Capturing Multiple Preference Effects from within an Ideal Point Framework,” (with J. Lee and K. Sudhir), Journal of Marketing Research, Vol. 39, No. 1, February 2002.

“2001: A Marketing Odyssey,” (with E. Brody), Vol. 20, No. 4, Marketing Science, Fall 2001.

“Consumer Strategies for Purchasing Assortments within a Single Product Class,” (with Jack K.H. Lee), Journal of Retailing, Vol. 75, No. 3, Fall 1999.

“The Max-Min-Min Principle of Product Differentiation,” (with A. Ansari and N. Economides), Journal of Regional Science, May 1998.

“Dynamic Influences on Individual Choice Behavior,” (with R. Meyer, T. Erdem, F. Feinberg, I. Gilboa, W. Hutchinson, A. Krishna, S. Lippman, C. Mela, A. Pazgal, and D. Prelic), Marketing Letters, Vol. 8, No. 3, July 1997.

“Addendum to ‘Cross Validating Regression Models in Marketing Research’,” (with W. Vanhonacker), Marketing Science, Vol. 15, No. 1, 1996.

“Selecting, Evaluating, and Updating Prospects in Direct Mail Marketing,” (with V. Rao), Journal of Direct Marketing, Vol. 9, No. 2, Spring 1995.

“A Cross-Cultural Analysis of Price Responses to Environmental Changes,” (with V. Rao), Marketing Letters, Vol. 6, No. 1, January 1995.

“Cross Validating Regression Models in Marketing Research,” (with W. Vanhonacker), Marketing Science, Vol. 12, No. 4, Fall 1993.

“Preference Aggregation and Repeat Buying in Households,” (with S. Gupta), Marketing Letters, Vol. 4, No. 4, October 1993.

“Roles in the NBA: There's Still Always Room for a Big Man, But His Role Has Changed” (with A. Ghosh), Interfaces, Vol. 23, No. 4, July-August 1993.

“Introduction to ‘Contributions of Panel and Point of Sale Data to Retailing Theory and Practice’,” Journal of Retailing, Vol. 68, No.3, Fall 1992.

“Explanations for Successful and Unsuccessful Marketing Decisions: The Decision Maker’s Perspective” (with M.T. Curren and V.S. Folkes), Journal of Marketing, Vol. 56, No. 2, April 1992.

“Locally Rational Decision Making: The Distracting Effect of Information on Managerial Performance” (with R. Glazer and R. Winer), Management Science, Vol. 38, No. 2, February 1992.

“Prospects and Problems in Modeling Group Decisions” (with K.P. Corfman, D.J. Curry, S. Gupta, and J. Shanteau), Marketing Letters, Vol. 2, No. 3, July 1991.

“A Stochastic Multidimensional Scaling Methodology for the Empirical Determination of Convex Indifference Curves in Consumer Preference/Choice Analysis” (with W.S. DeSarbo and K. Jedidi), Psychometrika, Vol. 56, No. 2, June 1991.

“A Polarization Model for Describing Group Preferences” (with V. Rao), Journal of Consumer Research, Vol. 18, No. 1, June 1991.

“On the Creation of Acceptable Conjoint Analysis Experimental Designs,” (with W.S. DeSarbo and V. Mahajan), Decision Sciences, Vol. 22, No. 2, Spring 1991.

“Longitudinal Patterns of Group Decisions: An Exploratory Analysis” (with K.P. Corfman and D.R. Lehmann), Multivariate Behavioral Research, Vol. 25, No. 3, July 1990.

“Investing in the Stock Market: Statistical Pooling of Individual Preference Judgments,” (with N. Capon), Annals of Operations Research, Vol. 23, 1990.

“Judgmental Forecasts of Key Marketing Variables: Rational vs. Adaptive Expectations” (with R. Glazer and R. Winer), International Journal of Forecasting, Vol. 6, No. 3, July 1990.

“Committee Decision Making in Organizations: An Experimental Test of the Core,” Decision Sciences, Vol. 21, No. 1, Winter 1990.

“Towards a New Way to Measure Power: Applying Conjoint Analysis to Group Purchase Decisions” (with J. O’Shaughnessy), Marketing Letters, Vol. 1, No. 1, December 1989.

“The Formation and Use of Key Marketing Variable Expectations and their Impact on Firm Performance: Some Experimental Evidence” (with R. Glazer and R. Winer), Marketing Science, Vol. 8, No. 1, Winter 1989.

“A Heterogeneous Conditional Logit Model of Choice” (with W. Vanhonacker), Journal of Business and Economic Statistics, Vol. 6, No. 3, July 1988.

“Estimating Probabilistic Choice Models from Sparse Data: A Method and an Application to Groups” (with D.R. Lehmann and K. Corfman), Psychological Bulletin, Vol. 95, No. 1, January 1988.

“A Friction Model for Describing and Forecasting Price Changes” (with W.S. DeSarbo, V.R. Rao, Y.J. Wind and R. Colombo), Marketing Science, Vol. 6, No. 4, Fall 1987.

“Group Process and Decision Performance in a Simulated Marketing Environment” (with R. Glazer and R. Winer), Journal of Business Research, Vol. 15, No. 6, December 1987.

“Effective Advertising in Industrial Supplier Directories” (with D.R. Lehmann), Industrial Marketing Management, Vol. 15, No. 2, April 1985.

Book Chapters

“Choice Experiments: Reducing Complexity and Measuring Behavior Rather than Perception” (with R. Fair, K. Shampanier, and A. Cai), in Legal Aspects of Marketing Theory (ed. with J. Gersen), New York: Cambridge University Press, 2023.

“The Inevitable Decline of American Political Discourse,” in Review of Marketing Research, Vol. 17, D. Iacobucci (ed.), Emerald Publishing, 2019.

“Dynamic Decision Making in Marketing Channels”, with S. Gupta, and A. Banerji, in Experimental Business Research, A. Rapoport and R. Zwick (eds.), Boston, MA: Kluwer Academic Publishers, 2002.

Refereed Proceedings

“PIONEER: Decision Support for Industrial Product Planning” in Efficiency and Effectiveness in Marketing, Proceedings of the American Marketing Association Educator's Conference, Vol. 54, 1988, G.L. Frazier and C.A. Ingene, eds., Chicago.

“Mathematical Approaches to the Study of Power: A Critical Review” in Advances in Consumer Research, Vol. XII, 1985, E. Hirschman and M. Holbrook, eds., Provo, UT.

“On Obtaining Measures from Ranks” in An Assessment of Marketing Thought and Practice, Proceedings of the American Marketing Association Educator's Conference, Vol. 48, B.J. Walker, ed., 1982, Chicago.

Other

“Don Lehmann: My Reflections On A Time Gone By,” essay in the Legends of Marketing Series.

“Find the Open Door: A Reflection,” in “Reflections of Eminent Marketing Scholars,” Foundations and Trends in Marketing, Special Issue, 2022, ed. by Dawn Iacobucci.

“New Survey Methods Address Consumer Uncertainty in Trademark Law” (with A. Cai and H. Rowland), IPWatchdog.com, October 8, 2021, <https://www.ipwatchdog.com/2021/10/08/new-survey-methods-address-consumer-uncertainty-trademark-law/id=138390/>

“COVID-19 and Bottom Line Impacts in Trademark Litigation” (with R. Befurt and A. Cai), Quickread, December 9, 2020, <http://quickreadbuzz.com/2020/12/09/business-valuation-befurt-steckel-covid-19-and-bottom-line-impacts-in-trademark-litigation/>

“New Survey Methods May Assess TM Dilution with More Detail” (with R. Befurt and A. Cai), August 14, 2020, Law 360, https://www.analysisgroup.com/globalassets/insights/publishing/2020_survey_methods_assess_tm_dilution_detail.pdf

“How Smart Marketers Gauge the Future to Shift Ahead of Consumer Needs” (with A. Adamson), American Management Association Playbook, December 18, 2017, <http://playbook.amanet.org/training-articles-marketers-shift-ahead-consumer-needs/>

“What Consumers Really Think About Reference Price Labels” (with R. Kirk Fair, K. Shampianier, L. O’Laughlin, and J. Shea), Law 360, March 21, 2017, https://www.analysisgroup.com/globalassets/content/insights/publishing/law360_reference_price_labels.pdf

“Paul Green: The Hulk Hogan of Marketing,” essay in the Legends of Marketing Series.

“Jerry Wind: A Man Ahead of His Time,” essay in the Legends of Marketing Series.

“Is it Worth Anything?: Using Surveys in Intellectual Property Cases?,” <https://www.analysisgroup.com/Insights/publishing/is-it-worth-anything--using-surveys-in-intellectual-property-cases>

“Forecasting Online Shopping,” Stern Business, Fall/Winter 2000, pp. 22-27.

“Method to Their Madness,” The Industry Standard, August 7, 2000.

Book review of The Application of Regression Analysis by D.R. Wittink, Journal of Marketing Research, Vol. 26, No. 4, November 1989.

Co-author (with many others) of The Statistics Problem Solver, Research and Education Association, New York, 1978.

CONFERENCE PRESENTATIONS

“Innovative Methodologies on Contemporary Trademark Law,” (with B. Beebe, R. Germano, and C. Sprigman), CREATE Trade Marks Seminar, University of Glasgow, June 2022.

“Consumer Uncertainty in Trademark Law: An Empirical Investigation,” (with B. Beebe, R. Germano, and C. Sprigman), 2021 Intellectual Property Scholars Conference, Cardozo Law School, August 2021.

“Trademark Law’s Shallow Empiricism: An Experimental and Theoretical Investigation,” (with B. Beebe, R. Germano, and C. Sprigman), Tri State Region IP Workshop, January 2021.

“The Evolving Business Ph.D.,” The Third Annual Global PhD Colloquium,” Fordham University, April 2019.

“Testing for Trademark Dilution in the Court and Lab,” (with B. Beebe, R. Germano, and C. Sprigman), Munich Summer Institute, June 2018.

“Trademark Dilution: Searching for the Elusive Unicorn,” Conference on Empirical Legal Studies, Cornell University, October 2017.

“Measuring Trademark Dilution”, Conference on Empirical Analysis of Intellectual Property, NYU Law School, October 2014.

“Using Surveys in Intellectual Property Cases: What’s the Damage?,” AIPLA Spring Meeting, May 2013, Seattle WA.

“Trademark Dilution: An Elusive Concept in the Law,” Conference on Brands and Branding in Law, Accounting, and Marketing Kanan Flagler School, University of North Caroline, April 2012

“The Role of Consumer Surveys in Trademark Infringement Cases: Evidence from the Federal Courts,” (with R. Bird), AMA Summer Educator’s Conference, August 2010, Boston.

“Global Market Share Dynamics: Winners and Losers in a Tumultuous World,” (with P. Golder and S. Chang), INFORMS Marketing Science Conference, June 2010, Cologne, Germany.

"Use and Abuse of Consumer Perception Research in Antitrust and Advertising Cases," ABA Antitrust Section Spring Meeting, March 2009, Washington, DC.

“New Product Development: The Stock Market as Crystal Ball,” (with D. Markovich), INFORMS Marketing Science Conference, Atlanta, GA., June 2005.

“Modeling Credit Card Usage Behavior: Where is my VISA and Should I Use It?,” (with Y. Chen), INFORMS Marketing Science Conference, College Park, Md., June 2003.

“Using Capital Markets as Market Intelligence: Evidence from the Pharmaceutical Industry,” (with D. Markovich and B. Yeung), INFORMS Marketing Science Conference, College Park, Md., June 2003.

“Using Capital Markets as Market Intelligence: Evidence from the Pharmaceutical Industry,” (with D. Markovich and B. Yeung), Share Price Accuracy and Transition Economies Conference, U. of Mich. Law School, Ann Arbor, Mi., May 2003.

“Modeling Internet Site Visit Behavior,” (with E. Bradlow and O. Sak), Joint Statistical Meetings, Indianapolis, August 2000.

"Consumer Strategies for Purchasing Assortments within a Single Product Class," (with Jack K.H. Lee), INFORMS Fall Conference, Philadelphia, November 1999.

“When Do Purchase Intentions Predict Sales?” (with V. Morwitz and A. Gupta), AMA Advanced Research Techniques Forum, Santa Fe, NM, June 1999.

"Modeling New Product Preannouncements as a Signaling Game," (with H. Jung), University of Mainz Conference on Competition in Marketing, Germany, June 1999.

“A Multiple Idea Point Model: Capturing Multiple Preference Effects from within an Ideal Point Framework,” (with J. Lee), Joint Statistical Meetings, Dallas, TX, Aug. 1998.

"Modeling New Product Preannouncements as a Signaling Game," (with H. Jung), INFORMS Marketing Science Conference, Fontainebleau, France, July 1998.

“Dynamic Decision-Making in Marketing Channels: Traditional Systems, Quick Response, and POS Information,” (with S. Gupta and A. Banerji), NYU Conference on Managerial Cognition, May 1998.

“When Do Purchase Intentions Predict Sales?” (with V. Morwitz and A. Gupta), INFORMS International Meetings, Barcelona, July 1997.

“Mental Models in Competitive Decision Making: A Blessing and A Curse,” Conference on Competitive Decision Making, Charleston, SC, June 1997.

“When Do Purchase Intentions Predict Sales?” (with V. Morwitz and A. Gupta), INFORMS Marketing Science Conference, Berkeley, March 1997.

“Model Adequacy versus Model Comparison: Is the ‘Best’ Model Any ‘Good’?, ” (with A. Ansari and P. Manchanda), INFORMS Marketing Science Conference, Berkeley, March 1997.

“Dynamic Decision-Making in Marketing Channels: Traditional Systems, Quick Response, and POS Information,” (with S. Gupta and A. Banerji), First Conference in Retailing and Service Sciences, Banff, 1994.

“Dynamic Decision-Making in Marketing Channels: Traditional Systems, Quick Response, and POS Information,” (with S. Gupta and A. Banerji), Behavioral Decision Research in Management Conference, Boston, 1994.

“Modeling Consideration Set Formation: The Role of Uncertainty,” (with B. Buchanan and S. Sen), TIMS Marketing Science Conference, Tucson, 1994.

“A Cross-Cultural Analysis of Price Conjectures to Environmental Changes,” (with V. Rao), TIMS Marketing Science Conference, St. Louis, 1993.

“Decision-Making in a Dynamic Distribution Channel Environment,” (with S. Gupta and A. Banerji), TIMS Marketing Science Conference, St. Louis, 1993.

“Cross Validating Regression Models in Marketing Research,” (with W. Vanhonacker), TIMS Marketing Science Conference, London, 1992.

“The Influence of Stock Price on Marketing Strategy,” (with D. Gautschi and D. Sabavala), TIMS Marketing Science Conference, Wilmington, DE, 1991.

“A Polarization Model for Describing Group Preferences” (with V. Rao), ORSA/TIMS National Fall Meetings, Philadelphia, 1990.

“A Polarization Model for Describing Group Preference,” (with V. Rao), Behavioral Decision Research in Management Conference, Philadelphia, 1990.

“Conflict Resolution and Repeat Buying” (with S. Gupta), TIMS Marketing Science Conference, Champaign, Ill., 1990.

“Variety Seeking at the Group Level” (with S. Gupta), Association for Consumer Research Fall Meetings, New Orleans, 1989.

“On Using Attraction Models to Allocate Resources in a Competitive Environment,” TIMS Marketing Science Conference, Durham, NC, 1989.

“Multidimensional Scaling with Convex Preferences” (with W.S. DeSarbo), ORSA/TIMS National Fall Meetings, St. Louis, 1987.

“A Social Comparison Model for Describing Group Preference Evaluations” (with V. Rao), TIMS Marketing Science Conference, Jouy-en-Josas, France, 1987.

“The Day the Earth Stood Still,” Association for Consumer Research Fall Meetings, Toronto, 1986.

“A Friction Model for Describing and Forecasting Price Movements” (with W. DeSarbo, V. Rao, Y. Wind, and R. Colombo), ORSA/TIMS National Fall Meetings, Miami Beach, 1986.

“An Eigenvalue Method for Measuring Consumer Preferences” (with E. Greenleaf and R. Stinerock), TIMS Marketing Science Conference, Dallas, 1986.

“Creating Conjoint Analysis Experimental Designs without Infeasible Stimuli” (with W. DeSarbo and V. Mahajan), TIMS Marketing Science Conference, Dallas, 1986.

“The Mediating Role of Information in Marketing Managers' Decisions” (with R. Glazer and R. Winer), TIMS Marketing Science Conference, Dallas, 1986.

“Incorporating Interdependencies of Utility Functions into Models of Bargaining” (with S. Gupta), ORSA/TIMS National Fall Meetings, Atlanta, 1985.

“The Formation of Key Marketing Variable Expectations” (with R. Glazer and R. Winer), ORSA/TIMS National Fall Meetings, Atlanta, 1985.

“Does the Nash Equilibrium Really Describe Competitive Behavior?: The Case of Cigarette Advertising,” TIMS Marketing Science Conference, Nashville, 1985.

“A Heterogeneous Conditional Logit Model of Choice” (with W. Vanhonacker), ORSA/TIMS National Fall Meetings, Dallas, 1984.

“Using a ‘Robust’ Response Function to Allocate Resources in a Competitive Environment,” TIMS Marketing Science Conference, Chicago, 1984.

“Longitudinal Models of Group Choice Behavior,” (with D. Lehmann and K. Corfman), ORSA/TIMS National Fall Meetings, Orlando, 1983.

“Considerations of Optimal Design of New Task Industrial Products,” ORSA/TIMS National Fall Meetings, San Diego, 1982.

“Game Theoretic Choice Models in Organizational Buying Behavior,” TIMS Special Interest Conference in Marketing Measurement and Analysis, Philadelphia, 1982.

OTHER RESEARCH IN PROGRESS

Neuroscience Methods of Measuring Trademark Infringement

Incentive Compatibility in Trademark Surveys

Getting Product Disclaimers Noticed

Marketing Research in the Courtroom vs. the Boardroom: What are the Differences and Do They Matter? (with R. Bird)

The Impact of Trademark Litigation Outcomes on Brand Equity and Marketing Decision Making

Modeling the Tradeoffs between Marketing Research and Flexible Manufacturing.

INVITED SEMINARS

Columbia University	Spring 1991, Summer 1994
Cornell University	Fall 1983, Spring 1989
Georgetown University	Fall 2006
Pennsylvania State University	Fall 1996, Fall 2006
Rutgers University	Spring 1994
Temple University	Fall 1995
University of California, Berkeley	Spring 1990
University of California, Los Angeles	Spring 1985, Spring 1996
University of California, San Diego	Fall 2003
University of Florida	Spring 1992
University of Mainz, Germany	Summer 1998
University of Michigan	Spring 1993
University of Pennsylvania	Spring 1992, Spring 1995, Spring 1998
University of Southern California	Spring 1987
Washington University, St. Louis	Spring 2003

EDITORIAL SERVICE

Editorships

Co-Editor-in-Chief, *Marketing Letters*, July 2010 – March 2017

Guest editor, special section of *Marketing Science* on the history of marketing science theory and practice, 2001.

Consulting editor in marketing, Addison-Wesley Longman Academic Publishers, Boston, MA, 1993-1999.

Guest editor, special issue of *Journal of Retailing* on the use of panel and point of sale data, 1992.

Other

Member of Advisory Board (current), *Marketing Letters*.

Have served on editorial board or as ad-hoc referee for *Journal of Marketing*, *Journal of Marketing Research*, *Stanford Law Review*, *Management Science*, *Marketing Science*, *Journal of Consumer Research*, *Journal of Retailing and Consumer Services*, *Manufacturing and Service Operations Management*, *Decision Sciences*, *Journal of Business and Economic Statistics*, *Journal of Econometrics*, *Journal of Retailing*, *Strategic Information Systems*, *Review of Marketing Science*, *Corporate Reputation Review*, and *Journal of Business Research*.

SERVICE

Dissertation Committees Chaired

Joseph Pancras (co-chair)	(Marketing - New York University)
Sergio Meza (co-chair)	(Marketing – New York University)
Dmitri Markovich	(Marketing – New York University)
Heonsoo Jung	(Marketing - New York University)
Jack Lee	(Marketing - New York University)
Asim Ansari (co-chair)	(Marketing - New York University)
Shahana Sen (co-chair)	(Marketing - New York University)

Dissertation Committees Served on

Tingting Fan (Marketing – New York University)
Kei-Wei Huang (Information Systems – New York University)
Sherrif Nassir (Marketing – New York University)
Jane Gu (Marketing – New York University)
Orkun Sak (Marketing – University of Pennsylvania)
Atanu Sinha (Marketing - New York University)
Louis Choi (Marketing - Columbia University)
Sunder Narayanan (Marketing - Columbia University)

Carol Rhodes (Ed. Psych. - Columbia University)
Rita Wheat (Marketing - Columbia University)
Robert Stinerock (Marketing - Columbia University)
Bruce Buchanan (Business Economics - Columbia University)
Chen Young Chang (Marketing - University of Pennsylvania)

Other Discipline Related Service

Chairperson, Marketing Committee, INFORMS, January 2006 – June 2010.
Past President, INFORMS Society on Marketing Science, January 2004 – December 2005.
Founding President, INFORMS Society on Marketing Science, January 2003 – December 2003.
President, INFORMS College on Marketing, January 2002 – December 2002.
President Elect, INFORMS College on Marketing, January 2000- December 2001.
Secretary-Treasurer, INFORMS College on Marketing, January 1998-December 1999.
Association of Consumer Research, Annual Program Committee, 1999.
Co-Organizer of 1996 Conference on Consumer Choice and Decision Making, Arden House,
Harriman, New York, June 1996.
Organized Marketing Sessions at Fall 1989 TIMS/ORSA Joint National Meetings, New York,
October 1989.

Other University Related Service

Member, NYU Doctoral Affairs Committee, September 2017 – August 2021.

Member, Research Resources Committee, Stern School of Business, September 2009 – August 2021.

Chair, Statistical and Quantitative Reasoning Task Force, Stern School of Business, September 2005 – August 2007.

Member, Specialization Committee, Stern School of Business, September 2004 - ff.

Member, PhD Oversight Committee, Stern School of Business, January 2006 – May 2007.

Member, Executive Committee, Digital Economy Initiative, Stern School of Business, January 2000 – August 2002.

Member, Board of Directors, Center for Information Intensive Organizations, Stern School of Business, September 1998 – December 1999.

Member of MBA Committee, Stern School of Business, New York University, 1989-December 1998. Committee was responsible for supervising redesign of MBA programs in 1991 and 1995, Chairman September 1997-August 1998.

Member of Stern MBA Curriculum Review Committee, September 1997-December 1998.
Committee redesigned MBA Core.

Member of Stern School Committee on Improving Consulting Activities, July 1998-December 1998.

Member of Building Committee, Stern School of Business, New York University, 1990-1992.

Member of Research Committee, Stern School of Business, New York University, 1990-1991.

Elected member of Columbia University Senate. Served on Budget Review and Alumni Relations Committees, 1986-1988.

AWARDS

Awarded the J. Parker Bursk Memorial Prize as the outstanding student participating in the Department of Statistics, University of Pennsylvania, 1979.

Dissertation was awarded Honorable Mention in the 1982 American Marketing Association Dissertation Competition.

Dissertation was named Winner of the 1983 Academy of Marketing Science Dissertation Competition.

Invited speaker at the J. Parker Bursk Memorial Prize Luncheon, Department of Statistics, University of Pennsylvania, 1992.

Invited speaker at American Marketing Association Doctoral Consortium, University of Southern California, 1999.

Cited for outstanding editorial support, Fordham University Pricing Center, Sept. 2002.

Named one of the inaugural winners of the Best Reviewer Award for the *Journal of Retailing*, 2003.

Work recognized by West publishing as one of the outstanding 2012 law review articles on Intellectual Property.

Work recognized with the Highly Commended Paper Award at the Literati Network Awards for Excellence 2013.

SELECTED CONSULTING AND OTHER PROFESSIONAL ACTIVITIES

AOL MovieFone, Inc., New York, NY. Performed general consulting on analyzing caller data for telephone movie information service; Consulted as expert in conjunction with damage assessment in legal proceedings.

Citicorp, New York, NY. Built choice model for bank services. Gave lectures on Marketing Strategy to CitiCards executives.

Directions for Decisions, Inc., New York, NY and Jersey City, NJ. Consulted on segmentation study of sports apparel market, designed and implemented “Construction Test”, a concept design decision tool. Performed general consulting on marketing research practice on an ongoing basis.

Federal Trade Commission, Washington, D.C. Served as consultant on branding strategies in antitrust investigation.

J.C. Penney Co., New York, NY. Performed sales-advertising response analysis. Work was done on request for Management Decision Systems, Inc., Weston, MA.

Pfizer Pharmaceuticals, New York, NY. Conducted seminar on conjoint analysis.

SilverBills, Inc., New York, NY. Member board of advisors.

Union Carbide Corporation, Danbury CT. Built econometric model to forecast prices.

Various Expert Witness Engagements. Clients include Amazon, AT&T, Avon, Brother International, Capri Sun, Dyson, Epson, Hershey's, JP Morgan Chase, Gerber Products, Johnson & Johnson, K-Swiss, Mead Johnson, Merck KGAA, Microsoft, Monster Cable, McDonald's, New Balance, Pelaton, Playtex, PNC Financial, Proctor & Gamble, Roche, Samsung, Seagate, Sergio Garcia, Sharp, TiVo, Under Armour, Wal-Mart, Warnaco, and various plaintiffs in consumer class actions.

MEMBERSHIPS

American Marketing Association

American Statistical Association

Association for Consumer Research

The Institute for Operations Research and Management Science (INFORMS)

Society for Consumer Psychology

American Association for Public Opinion Research

APPENDIX B
RECENT TESTIMONY

TESTIMONY IN THE LAST FOUR YEARS

Depositions

Mahindra & Mahindra Ltd. and Mahindra Automotive North America v. FCA US LLC, Case No.: 2:18-CV-12645-GAD-SDD, United States District Court (Eastern District of Michigan); In the Matter of Certain Motorized Vehicles and Components Thereof, Investigation No. 337-TA-1132, United States International Trade Commission, Washington D.C.

Susan Wang, Rene Lee and all others similarly situated, v. StubHub, Inc., Superior Court of the State of California for the County of San Francisco (Case No: CGC-18564120).

Match Group, LLC, v. Bumble Trading Inc., Bumble Holding, LTD., Badoo Trading Limited, Magic Lab Co., Worldwide Vision Limited, Badoo Limited, Badoo Software Limited, Badoo Software Limited, and Badoo Technologies Limited, United States District Court for the District of Texas Waco Division, No. 6:18-CV-00080-ADA.

Brian Gozdenovich, on behalf of himself and all others similarly situated v. AARP, Inc., AARP Services, Inc., AARP Insurance Plan, Unitedhealth Group, Inc. and United Healthcare Insurance Company, United States District Court, District of New Jersey, Case No. 2:18-cv-02788-MCA-MAH.

American Dairy Queen Corporation v. W.B. Mason Co., Inc., United States District Court (District of Minnesota), Civ. Act. No. 0:18-cv-00693-SRM-ECW.

Maglula, LTD. v. Amazon.com, Inc., and Amazon.com Services, LLC (United States District Court For the Eastern District of Virginia, Alexandria Division -Civil Action No.: 1:19-cv-01570-LO-IDD.

Capri Sun GMBH v. American Beverage Corporation, United States District Court for the Southern District of New York; 1:19-cv-1422.

Biologics, Inc. D/B/A Biologics by McKesson Corporation v. OptumRx, Inc., AAA Case No. 01-20-0007-3159 (American Arbitration Association).

Tiffany and Company and Tiffany (NJ) LLC v. Costco Wholesale Corporation, United States District Court, Southern District of New York case number 13 Civ. 1041.

Theta, IP, LLC. v. Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc., United States District Court for the Western District of Texas, Waco Division, Civil Action No.: 6:20-cv-00160-ADA.

Eric Fishon and Alicia Pearlman, individually and on behalf of all others similarly situated v. Peloton Interactive, Inc., United States District Court, Southern District of New York, Case No. 1:19-CV-11711-LJL.

Eric Fishon, individually and on behalf of all others similarly situated, v. Premier Nutrition Corporation f/k/a Joint Juice, Inc., Defendant, United States District Court, Northern District of California – San Francisco Division, Case No. 3:16-cv-06980.

Parts ID, LLC (Plaintiff) v. ID Parts LLC, (Defendant), In the United States District Court for the District of Massachusetts, Civil Action No. 1:20-cv-11253.

Zuru LLC and Zuru Inc. (Petitioners), v. Lego Juris A/S (Respondent), United States Patent and Trademark Office Before the Trademark Trial and Appeal Board, Reg. Nos.: 1,018,875 and 2,245,652.

24-7 Bright Star Healthcare, LLC v. Res-Care, Inc. d/b/a BrightSpring Health Services, United States District Court, Northern District of Illinois - Eastern Division, Case No. 1:21-cv-4609.

State of Arizona, *ex rel.* Mark Brnovich, Attorney General, v. Google LLC, Superior Court of the State of Arizona in and for the County of Maricopa, Case No. CV2020-006219.

Adidas America, Inc. and Adidas AG v. Thom Browne Inc., United States District Court, Southern District of New York, Case No. 1:21-CV-05615

Ryan Hardin, et al v. Samsung Electronics Co. Ltd. et al., United States District Court, Eastern District of Texas – Marshall Division, Case No. 2:21-CV-0290-JRG.

U.S. Dominion, Inc., Dominion Voting Systems, Inc., and Dominion Voting Systems Corporation v. Fox News Network, LLC, Superior Court for the State of Delaware, Case No. N21C-03-257 EMD.

State of North Dakota v. United States of America, United States District Court, District of North Dakota – Western Division, Case No. 1:19-cv-150-DMT-ARS.

Chervon (HK) Limited, Chervon North America Inc., v. One World Technologies, Inc., Techtronic Industries Co. Ltd, Homelite Consumer Products, Inc., United States District Court for the District of Delaware, Case No.: 19-1293-LPS-SRF.

Vans. Inc.; and VF Outdoor, LLC v. Walmart, Inc.; The Doll Maker, LLC; Trendy Trading, LLC; and ACI International, United States District Court for the District of Central California, Southern Division, Case No. 8:21-cv-01876-DOC-KES.

Trial

Adidas America, Inc. and Adidas AG v. Thom Browne Inc., United States District Court, Southern District of New York, Case No. 1:21-CV-05615.

Parts ID, LLC (Plaintiff) v. ID Parts LLC, (Defendant), In the United States District Court for the District of Massachusetts, Civil Action No. 1:20-cv-11253.

Arbitration Hearing

Biologics, Inc. D/B/A Biologics by McKesson Corporation v. OptumRx, Inc., AAA Case No. 01-20-0007-3159 (American Arbitration Association).

Preliminary Injunction Hearing

Danone US, LLC. v. Chobani, LLC., Case Action No. 18 CV 11702, United States District Court (Southern District of New York)

Other Hearings

In the Matter of Distribution of the 2010, 2011, 2012, 2013 Cable Royalty Funds, (Before the Copyright Royalty Judges, Washington D.C.) Docket No. 14-CRB-0010-CD (2010-13)

In the Matter of Certain Motorized Vehicles and Components Thereof, Investigation No. 337-TA-1132, United States International Trade Commission, Washington D.C.

APPENDIX C
MATERIALS CONSIDERED

Court Filings

Arm Ltd.’s Objections and Responses to Qualcomm’s Fourth Set of Interrogatories (Nos. 21-25), *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, November 17, 2023.

Complaint, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, Case No.: 1:22-cv-01146-UNA, United States District Court for the District of Delaware, August 31, 2022.

Defendants’ Answer and Defenses to Plaintiff’s Complaint and Jury Demand and Defendants’ Amended Counterclaim, *Arm Ltd. V. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146 (MN), United States District Court for the District of Delaware, October 26, 2022.

Plaintiff Arm Ltd.’s Responses and Objections to Qualcomm’s First Requests for Admissions to Plaintiff (Nos. 1-30), *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, November 17, 2023.

Expert Reports

Expert Report of Ravi Dhar, *Moab Industries, LLC. v. Chrysler Group LLC*, C.A. No. 3:12-cv-08247-HRH, United States District Court for the District of Arizona, March 7, 2014.

Expert Report of Ravi Dhar Regarding Trademark Infringement, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, December 20, 2022, and materials considered.

Depositions

Deposition of Christiano Amon, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, November 15, 2023.

Deposition of James Thompson, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, November 28, 2023.

Deposition of Jonathan Armstrong, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146, United States District Court for the District of Delaware, December 8, 2023.

Deposition of Michael Roberts, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, November 28, 2023.

Deposition of Paul Williamson, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146 (MN), United States District Court for the District of Delaware, November 9, 2023.

Deposition of Rene Haas, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146 (MN), United States District Court for the District of Delaware, December 12, 2023.

Deposition of Simon Segars, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146 (MN), United States District Court for the District of Delaware, November 16, 2023.

Deposition of Will Abbey, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, October 27, 2023.

Deposition of Ziad Asghar, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.*, C.A. No. 22-1146-MN, United States District Court for the District of Delaware, November 8, 2023.

Bates-Stamped Documents

ARM_00055357–399.

ARM_00060458–512.

ARM_00088656–684.

ARM_00111099–113.

ARM_01259705–0105.

ARM_01422901.

ARM_01425245–252.

QCARM_0337839–855.

QCARM_7517739–744.

Academic Literature

Diamond, Shari S., “Reference Guide on Survey Research,” in *Reference Manual on Scientific Evidence*, Third Edition, National Academies Press, 2011, pp. 359-423.

Keller, Kevin L., and Vanitha Swaminathan, *Strategic Brand Management: Building, Measuring, and Managing Brand Equity*, Fifth Edition, Pearson, 2020.

Kerlinger, F.N., and H.B. Lee, *Foundations of Behavioral Research*, Fourth Edition, Cengage Learning, 2000.

Kotler, Philip, and Kevin L. Keller, *Marketing Management*, Fifteenth Edition, Pearson, 2016.

Kotler, Philip, and Waldemar Pfoertsch, *B2B Brand Management*, Springer, 2006.

Kotler, Philip, and Waldemar Pfoertsch, *Ingredient Branding: Making the Invisible Visible*, Springer, 2010.

Meyer, M.A., and J.M. Booker, *Eliciting and Analyzing Expert Judgment: A Practical Guide*, SIAM & ASA, 2001.

Rosnow, Ralph L. and Robert Rosenthal, *Beginning Behavioral Research*, Seventh Edition, Pearson, 2012.

Turley, Lou, and Scott Kelley, “A Comparison of Advertising Content: Business to Business Versus Consumer Services,” *Journal of Advertising*, Vol. 26, No. 4, 1997, pp. 39-48.

Wegner, Peter, “Interoperability,” *ACM Computing Surveys (CSUR)*, Vol. 28, No. 1, 1996, pp. 285-287.

Publicly Available Documents

@SamsungMobile, “Battle your way to victory with the upgraded Snapdragon® 8 Gen 2 Mobile Platform. 🎮 #GalaxyZFold5 #JoinTheFlipSide #SamsungUnpacked,” X, available at <https://x.com/samsungmobile/status/1684163305437532160?s=51>.

“Acer Chromebook Spin 513,” *Acer*, available at <https://www.acer.com/us-en/chromebooks/acer-chromebook-spin-513-cp513-1h-cp513-1hl-r841lt-r841t>.

Arm SEC Form 424(b)(4), September 13, 2023, available at https://www.sec.gov/Archives/edgar/data/1973239/000119312523235320/d550931d424b4.htm#rom550931_7.

“Building the Grenadier: Episode 5 – Engine and Transmission,” *INEOS*, available at <https://ineosgrenadier.com/en/us/explore/the-grenadier-videos-and-stories/building-the-grenadier/engine-and-transmission>.

Clark, Mitchell, “Qualcomm’s Server and Laptop Ambitions May Be in Trouble,” *The Verge*, August 31, 2022, available at <https://www.theverge.com/2022/8/31/23331493/arm-qualcomm-nuvia-lawsuit-architecture-license-servers-desktops>.

Devine, Richard, “Windows Finally Has Its Apple Mac Moment, and I’m More Excited About the Future of Laptops Than Ever Before,” *Windows Central*, October 25, 2023, available at <https://www.windowscentral.com/hardware/laptops/windows-has-its-mac-moment-more-excited-about-the-future-of-laptops-than-ever>.

“Fair Use of Trademarks (Intended for a Non-Legal Audience),” *International Trademark Association*, December 16, 2020, available at <https://www.inta.org/fact-sheets/fair-use-of-trademarks-intended-for-a-non-legal-audience/>.

“FYE24-Q2_ArmHoldingsPlc_Historical_Quarters_Datasheet.xlsx,” *Arm Holdings plc*, available at <https://investors.arm.com/static-files/4de417b7-2ea6-4f60-a1ce-13477d3b28b3>.

“FYE24-Q2 Shareholder Letter,” *Arm Holdings plc*, November 8, 2023, available at <https://investors.arm.com/static-files/bf24c7a3-d2c0-47bd-bf72-73f686a5d62f>.

“FYE24-Q3 Shareholder Letter,” *Arm Holdings plc*, February 7, 2024, available at <https://investors.arm.com/static-files/4404a89a-d033-419e-aa0f-d7b15d40e11f>.

““HP Laptop 14” FHD, Touch, Qualcomm Snapdragon 7c Gen 2, 4GB RAM, 128 GB eMMC, Silver, Windows 11, 14-ed0123wm,” *Walmart*, available at <https://www.walmart.com/ip/HP-Laptop-14-FHD-Touch-Qualcomm-Snapdragon-7c-Gen-2-4GB-RAM-128-GB-eMMC-Silver-Windows-11-14-ed0123wm/185295507>.

“Ingredient Branding: End User Marketing and ‘Intel Inside,’” *Intel*, available at <https://www.intel.com/content/www/us/en/history/virtual-vault/articles/end-user-marketing-intel-inside.html>.

Jain, Sourabh, “Qualcomm Snapdragon Tech Summit 2022 — Snapdragon 8 Gen 2, [REDACTED] CPU, AR2 Gen 1 Platform, and Other Announcements,” *Business Insider India*, November 17, 2022, available at [https://www.businessinsider.in/tech/news/qualcomm-snapdragon-tech-summit-2022-snapdragon-8-gen-2-\[REDACTED\]-cpu-ar2-gen-1-platform-and-other-announcements/articleshow/95581109.cms](https://www.businessinsider.in/tech/news/qualcomm-snapdragon-tech-summit-2022-snapdragon-8-gen-2-[REDACTED]-cpu-ar2-gen-1-platform-and-other-announcements/articleshow/95581109.cms).

Lardinois, Frederic, “Arm After the IPO,” *TechCrunch*, September 14, 2023, available at <https://techcrunch.com/2023/09/14/arm-after-the-ipo/>.

Lee, Leonard, “Arm-Qualcomm Lawsuit Could Muddle US Chip Design Leadership,” *Bloomberg Law*, June 13, 2023, available at <https://news.bloomberglaw.com/us-law-week/arm-qualcomm-lawsuit-could-muddle-us-chip-design-leadership>.

Leswing, Kif, “Why Arm’s Lawsuit Against Qualcomm Is a Big Deal,” *CNBC*, September 1, 2022, available at <https://www.cnn.com/2022/09/01/why-arms-lawsuit-against-qualcomm-is-a-big-deal.html>.

“Manufacturers’ Market Share of Smartphone Sales in the United States from 1st Quarter 2016 to 2nd Quarter 2023,” *Statista*, October 27, 2023, available at <https://www.statista.com/statistics/620805/smartphone-sales-market-share-in-the-us-by-vendor/>.

“Meet Galaxy Book Go,” *Samsung*, available at <https://www.samsung.com/us/app/computing/galaxy-book-go/>.

“Microsoft Trademark and Brand Guidelines,” *Microsoft*, available at <https://www.microsoft.com/en-us/legal/intellectualproperty/trademarks>.

Moorhead, Patrick, “Research Note: Arm’s ‘Blackhawk’ CPU Is An Audacious Plan To Have The Best Smartphone CPU Core This Year,” *Moor Insights & Strategy*, January 8, 2024, available at <https://moorinsightsstrategy.com/research-notes/research-note-arms-blackhawk-cpu-is-an-audacious-plan-to-have-the-best-smartphone-cpu-core-this-year/>.

Motley Fool Transcribing, “Arm Holdings (ARM) Q3 2024 Earnings Call Transcript,” *The Motley Fool*, February 7, 2024, available at <https://www.fool.com/earnings/call-transcripts/2024/02/07/arm-holdings-arm-q3-2024-earnings-call-transcript/>.

“Qualcomm (QCOM) Q4 2023 Earnings Call Transcript,” *The Motley Fool*, September 30, 2023, available at <https://www.fool.com/earnings/call-transcripts/2023/11/01/qualcomm-qcom-q4-2023-earnings-call-transcript/>.

“Qualcomm Announces Next-Generation Snapdragon Mobile Chipset Family,” *Qualcomm*, February 13, 2011, available at <https://www.qualcomm.com/news/releases/2011/02/qualcomm-announces-next-generation-snapdragon-mobile-chipset-family>.

“Qualcomm Application Processors Selector Guide,” *Qualcomm*, 2022, available at <https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/application-processors-selection-guide.pdf>.

“Qualcomm Completes Acquisition of Nuvia,” *Qualcomm*, March 15, 2021, available at <https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia>.

“Qualcomm® Snapdragon 410E (APQ 8016E) Processor Device Specification,” *Qualcomm*, September 2016, available at https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/snapdragon_410e_apq_8016e_data_sheet.pdf.

Robinson, Dan, “Arm Cooking Up Powerful Cortex-X CPU to Beat iPhone Performance, Says Industry Watcher,” *The Register*, January 11, 2024, available at https://www.theregister.com/2024/01/11/arm_cooking_up_powerful_cortexx/.

Rubino, Daniel, “Qualcomm Brings Receipts: Snapdragon X Elite Gets Benchmarked, Completely Dunks on Apple’s M2 Processor,” *Windows Central*, October 30, 2023, available at <https://www.windowscentral.com/hardware/laptops/qualcomm-brings-the-receipts-snapdragon-x-elite-gets-benchmarked-proves-it-beats-apples-m2-processor>.

“Senior Manager, Sourcing,” *Qualcomm*, available at <https://careers.qualcomm.com/careers/job/446697478074>.

Shimpi, Anand L., “The ARM Diaries, Part 1: How ARM’s Business Model Works,” *AnandTech*, June 28, 2013, available at <https://www.anandtech.com/show/7112/the-arm-diaries-part-1-how-arms-business-model-works>.

“Snapdragon for Inspiron 14,” *Dell*, available at <https://www.dell.com/en-us/lp/qualcomm-snapdragon>.

“Snapdragon® 8 Gen 3 Mobile Platform,” *Qualcomm*, October 23, 2023, https://docs.qualcomm.com/bundle/publicresource/87-71408-1_REV_B_Snapdragon_8_gen_3_Mobile_Platform_Product_Brief.pdf.

“ThinkPad X13s Snapdragon (13”),” *Lenovo*, available at [https://www.lenovo.com/us/en/p/laptops/thinkpad/thinkpadx/thinkpad--x13s-\(13-inch-snapdragon\)/21bx0008us?orgRef=https%253A%252F%252Fwww.google.com%252F](https://www.lenovo.com/us/en/p/laptops/thinkpad/thinkpadx/thinkpad--x13s-(13-inch-snapdragon)/21bx0008us?orgRef=https%253A%252F%252Fwww.google.com%252F).

Other

Conversation with Ziad Asghar, February 20, 2024.

Exhibit 12

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**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

ARM LTD.,

Plaintiff,

v.

QUALCOMM INC., QUALCOMM
TECHNOLOGIES, INC. and NUVIA, INC.,

Defendants

C.A. No. 22-1146 (MN)

REPLY EXPERT REPORT OF DR. MURALI ANNAVARAM

MARCH 25, 2024

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I.	INTRODUCTION	1
II.	SUMMARY OF OPINIONS	2
III.	BASIS FOR OPINIONS	5
IV.	DR. COLWELL HAS CONFLATED ISSUES ADDRESSED IN MY OPENING REPORT RELATED TO THE NUVIA TLA AND MY REBUTTAL REPORT RELATED TO THE NUVIA ALA	6
V.	QUALCOMM [REDACTED] [REDACTED]	
A.	The [REDACTED]	
B.	The [REDACTED] [REDACTED]	
C.	Dr. Colwell [REDACTED] [REDACTED]	

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I. INTRODUCTION

1. My name is Murali Annavaram. I have been retained to testify as an expert in this action on behalf of Defendants Qualcomm Inc., Qualcomm Technologies (collectively, “Qualcomm”), and Nuvia, Inc. (“Nuvia”) (together, “Defendants”). My qualifications are set forth in my previously submitted expert report in this matter on December 20, 2023 (“Opening Report”). As with my Opening Report and my Rebuttal Report dated February 27, 2024 (“Rebuttal Report”), both of which I incorporate by reference in this report, I am being compensated for my time at my standard consulting rate of \$600, and my compensation is not contingent on any conclusions that I reach or opinions that I may reach.
2. For this report, I have been asked to consider the analysis and opinions provided in the Rebuttal Expert Report of Dr. Robert Colwell (the “Colwell Reb. Rpt.”). I have reviewed Dr. Colwell’s Rebuttal Report and the materials in the attached Appendices and Exhibits. In my Rebuttal Report I previously responded to Dr. Colwell’s Opening Report (the “Colwell Op. Rpt.”) and Dr. Chen’s Report (the “Chen Rpt.”).
3. I expect to be called to provide expert testimony regarding opinions formed resulting from my analysis of the issues considered in this Reply Report, the materials that I have relied upon, and how I reached my opinions. If asked to testify about these issues, I may also discuss my own work, teaching, and publications in the field, knowledge of the state of the art in the relevant time period, and what certain technical terms are understood to mean in the field, including by those involved in the design of microarchitecture. I may rely on handbooks, textbooks, technical literature, my own personal experience in the field, and other relevant materials and/or information to explain relevant technologies, the state of the art in the relevant period, and the evolution of relevant technologies. I may also create demonstratives to further explain some of the discussion that appears in this report. And, I may also discuss the source

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code that Qualcomm has made available for inspection that I have personally reviewed many times.

4. I reserve the right to modify or supplement my opinions, as well as the basis for my opinions, in light of new positions taken by ARM or its experts, the nature and content of the documentation, data, proof, and other evidence or testimony that Plaintiff, ARM LTD. (“ARM”) or its experts may present, or any additional discovery or other information provided to me or found by me in connection with this matter.
5. I reserve the right to supplement the opinions in this report if any subsequent testimony or facts are revealed through discovery, as well as if any subsequent reports produced by ARM’s experts.

II. SUMMARY OF OPINIONS

6. This section contains a summary of opinions I provide in this report.
7. As explained in my prior reports, Qualcomm Product Designs, as I use the term in my reports, are [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] As I described in my Rebuttal Report, the [REDACTED]

[REDACTED] Rebuttal Report ¶3. Dr. Colwell appears to refer to all the cores on the source code machine as [REDACTED]

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[REDACTED]

8. Dr. Colwell, in the Colwell Rbt. Rpt., made several “observations and opinions” regarding my analysis of [REDACTED] described in my Opening Report, and further opined that “Qualcomm and Nuvia [REDACTED]

[REDACTED] Colwell Reb. Rpt. ¶¶5-6. I submit this Reply Report to address those observations and opinions.

9. First, Dr. Colwell’s criticisms of my Opening Report related to [REDACTED] [REDACTED] are both misplaced and unsupported. In my Opening Report, I discussed the [REDACTED]

[REDACTED] under the Qualcomm TLA. The [REDACTED] described in my Opening Report [REDACTED]

[REDACTED] Opening Report ¶¶2-3. These are [REDACTED] as I describe below in Section V.B. The [REDACTED]

10. In my Rebuttal Report, I discussed why [REDACTED] [REDACTED] as defined in the Nuvia ALA. Rebuttal Report ¶¶10-19. The [REDACTED]

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[REDACTED]

11. Dr. Colwell alleges that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Rather, as I explain in my Rebuttal Report, [REDACTED]

[REDACTED]

[REDACTED] Rebuttal Report §§VI.A-B. Further, [REDACTED]

[REDACTED]

[REDACTED] under the Nuvia ALA. Rebuttal Report §VI.

12. Even as to [REDACTED]

that Dr. Colwell identifies [REDACTED] (Colwell Rbt. Rpt. ¶21), the concept of cache coherence and memory access ordering rules, such as the Release consistency models, are well-known concepts in computer architecture and ARM has merely incorporated prior known techniques into its Arm ARM document. Rebuttal Report ¶291. Arm ARM descriptions cannot simply be “implemented” as Dr. Colwell alleges. Colwell Rbt. Rpt. ¶21.

[REDACTED]

[REDACTED]

[REDACTED]

¹ ARM Ltd., ARM Architecture Reference Manual for A-Profile Architecture A1-38, (J.a 2023), <https://documentation-service.arm.com/static/644a406baa78c007af74e6fd?token=> (last visited February 21, 2024) (also produced at ARM_00011869).

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design is not, as Dr. Colwell alleges, about implementing a PDF description (such as the Arm ARM) correctly. ARM makes this very clear in its own documentation as it explains the difference between architecture and microarchitecture, stating that “Architecture does not tell you how a processor is built or how it works. The build and design of a processor is referred to as micro-architecture. Micro-architecture tells you how a particular processor works.”²

13. Second, Dr. Colwell has failed to support his criticisms of the [REDACTED]. As detailed in my Opening Report, [REDACTED]

[REDACTED] As detailed below, the Colwell Rbt. Rpt. fails to identify and substantiate [REDACTED]

Dr. Colwell’s criticism of [REDACTED]

[REDACTED] I discussed in my Opening Report, and citation to testimony out of context does not change my opinions. As I explained in my Opening Report, [REDACTED]

[REDACTED] Opening Report ¶4.

III. BASIS FOR OPINIONS

14. My opinions are made in view of my knowledge and experience in the technical areas at issue in this report and the materials that I have considered. My qualifications are summarized in Section II of my Opening Report.

² ARM Ltd., Learn the Architecture – Introducing the Arm Architecture 12, (2.1 2023) <https://documentation.service.arm.com/static/64dcdf2a934840622b3496c9?token=> (last visited February 4, 2024).

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15. As part of my preparation for writing this Report, I reviewed the materials listed in Appendix A to this Reply Report. These materials include, but are not limited to, the following: (1) Qualcomm’s and Nuvia’s development documents, microarchitecture specifications, and source code; (2) ARM’s documentation including the ARM Reference Manuals, architecture documents and extensions; (3) license agreements and correspondence between the parties and copies of the documents described in this report; (4) discovery responses and deposition transcripts; (5) Dr. Colwell’s and Dr. Chen’s reports (including the Chen Rpt., the Colwell Op. Rpt., the Colwell Rbt. Rpt., and materials these reports cite), and (6) my prior Opening Report and Rebuttal Report.

IV. DR. COLWELL HAS CONFLATED ISSUES ADDRESSED IN MY OPENING REPORT RELATED TO THE NUVIA TLA AND MY REBUTTAL REPORT RELATED TO THE NUVIA ALA

16. Dr. Colwell alleges in Section IV.A.1 of his rebuttal report (Colwell Reb. Rpt. ¶¶19-29) that

[REDACTED]

[REDACTED] for the reasons described in the Colwell Op. Rpt. Colwell Reb. Rpt. ¶20. I disagree with this allegation for the reasons detailed in my Rebuttal Report.

17. As I stated in my Rebuttal Report, there is disagreement regarding what is included in “ARM Technology,”³ but, [REDACTED]

³ As stated in my Rebuttal Report ¶89 regarding [REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED] The materials defined as [REDACTED]

[REDACTED] In my Rebuttal Report, I specifically considered the Arm ARM, which provide details related to the ARM Architecture, but, as ARM stated in ARM’s own documentation, “is not intended to describe how to build an implementation of the PE [processing element].”⁴ That is, the Arm ARM [REDACTED]

[REDACTED]

[REDACTED] Indeed, ARM makes this very clear in its own documentation, which explains the difference between architecture and microarchitecture, stating that “Architecture does not tell you how a processor is built and works. The build and design of a processor is referred to as micro-architecture. Micro-architecture tells you how a processor works.”⁵ Dr. Colwell also references his endorsement of qualitative and quantitative conclusions that he endorsed from the Chen Rpt. to support his allegation that [REDACTED]

[REDACTED] (Colwell Reb. Rpt. ¶¶22-25), which I disagreed with as detailed in my Rebuttal Report. Rebuttal Report ¶¶253-318.

18. Dr. Colwell alleges in Section IV.A.2 of his rebuttal report (Colwell Reb. Rpt. ¶¶26-29) that my Opening Report makes [REDACTED]

[REDACTED] Colwell Reb. Rpt. ¶26. The Colwell Rbt.

⁴ <https://documentation-service.arm.com/static/644a406baa78c007af74e6fd?token=> (last visited March 10, 2024, also produced at ARM_00011869-24808 at 11905) at A1.1 (emphasis added).

⁵ <https://developer.arm.com/documentation/102404/latest> (last visited March 10, 2024), Learn the architecture - Introducing the Arm architecture at 12.

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Rpt. discusses the April 1, 2022 Certification letter that certified Nuvia’s compliance with termination obligations of the Nuvia ALA and TLA. Colwell Reb. Rpt. ¶¶5-6, 16-18, 25, 30,

35. Dr. Colwell states that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Colwell Reb. Rpt.

¶5 (emphasis added). Dr. Colwell later notes in his allegation that the [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Colwell Reb. Rpt. ¶30.

19. But Dr. Colwell failed to recognize changes in [REDACTED]

[REDACTED] from Qualcomm’s acquisition of Nuvia on March 15, 2021 to April 1, 2022 (the date of the letter certifying removal of ARM Confidential Information or ARM Technology in compliance with the Nuvia ALA). Even the [REDACTED] from Dr. Chen’s analysis that Dr. Colwell has endorsed, such as the [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

20.

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

21. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

22. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

23. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

24. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

25. [REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

26. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁶ I spoke with [REDACTED]
[REDACTED]

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[REDACTED]

27. [REDACTED]

28. For example, [REDACTED]

29. That is, [REDACTED]

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30. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

31. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

32. [REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

33. I have [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

HIGHLY CONFIDENTIAL - SOURCE CODE – ATTORNEY’S EYES ONLY

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

34. Similarly, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

35. [REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] I have listed many such examples above. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Colwell Reb. Rpt. ¶¶37-41

V. [REDACTED]

A. The [REDACTED]

36. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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39.

██████████

████████████████████

42. _____

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

B. The [REDACTED]

46. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

50. Next, in Section IV.C of his rebuttal report (Colwell Reb. Rpt. ¶¶37-41), Dr. Colwell discusses

how my Opening Report “focused ... [REDACTED]

[REDACTED]

[REDACTED]

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Colwell Reb. Rpt. ¶37. Dr. Colwell concludes that “Dr. Annavaram fails to explain why [REDACTED]

Colwell Reb. Rpt.

¶41.

51. As discussed in my Opening Report, the [REDACTED]

Opening Report ¶4.

as described in my Opening Report. Regarding

for the reasons described in the Rebuttal Report, and thus

beyond that described in my Opening Report. [REDACTED]

--	--

52. As to [REDACTED]

Opening Report ¶4. And as I detailed in my Opening Report, [REDACTED]

Opening Report ¶4.

53. After the [REDACTED]

For example, [REDACTED]

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[REDACTED]

[REDACTED] Opening Report ¶92.

54. Dr. Colwell’s allegation that I “fail[] to explain why [REDACTED]

[REDACTED]

[REDACTED] (Colwell Reb. Rpt. ¶41) is misplaced. My Opening Report and this Reply Report addresses [REDACTED] My Rebuttal Report details why [REDACTED]

[REDACTED]

[REDACTED] There was no reason to discuss [REDACTED] in my Opening Report because [REDACTED]

[REDACTED]

I discussed in my Rebuttal Report [REDACTED]

[REDACTED]

[REDACTED] Thus, although Dr. Colwell alleges that my Opening Report fails “to explain why [REDACTED]

[REDACTED]

[REDACTED] (Colwell Reb. Rpt. ¶41), my Rebuttal Report explains [REDACTED]

[REDACTED] Rebuttal Report §§VI-VII.

C. Dr. Colwell [REDACTED]

55. In Section IV.D of his rebuttal report (Colwell Reb. Rpt. ¶¶42-47), Dr. Colwell suggests that I

did “not fully analyze or verify [REDACTED] Colwell Reb. Rpt. ¶42. As Dr. Colwell acknowledges, I described in detail the methodology being performed, [REDACTED]

[REDACTED]

[REDACTED] Colwell Reb. Rpt. ¶42. Regarding my

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analysis of the results, Dr. Colwell also admits that I do discuss [REDACTED]
but he appears to allege that because there are fewer paragraphs discussing the results than the methodology that my analysis regarding the results is somehow deficient.

56. As Dr. Colwell noted, I provided in my Opening Report an example of my analysis of results from [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Dr. Colwell did not identify any errors in my analysis.

57. Dr. Colwell alleges that I show [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

58. Dr. Colwell also alleges that my analysis was not complete because I did “not say that [I]

[REDACTED]

Colwell Reb. Rpt. ¶44. [REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

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59. Dr. Colwell identifies [REDACTED]
[REDACTED] (Colwell Reb. Rpt. ¶45), but none of the
documents or testimony indicate d [REDACTED] that I
described in my Opening Report.

60. Specifically, Dr. Colwell alleges t [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

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[REDACTED]

61. [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

63. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

64. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

65. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

66. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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I certify under penalty of perjury that the foregoing is true and correct.

Date: March 25, 2024

Los Angeles, California



Murali Annavaram, Ph.D.

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ARM LTD.,

Plaintiff,

v.

QUALCOMM INC., QUALCOMM
TECHNOLOGIES, INC. and NUVIA, INC.,

Defendants

C.A. No. 22-1146 (MN)

REPLY EXPERT REPORT OF DR. MURALI ANNAVARAM

APPENDIX

A

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

APPENDIX A

MATERIALS CONSIDERED

1. Documents referenced in my Reply Expert Report.

2. Docket:

Complaint dated August 31, 2022

3. Discovery Responses, witness deposition transcripts, and exhibits thereto, including:

2023.10.26 - QC's Amended and Supplemental R&Os to ARM ROG No. 5
2023.11.17 - QC's Supplemental R&Os to ARM's 1st Set of ROGs (Nos. 7-12)
2023.10.27.23 - Sharma, Nitin Deposition Transcript
2023.11.03 - Williams III, Gerard Deposition Transcript
2023.11.29 - Bos, Lynn Deposition Transcript
2023.12.20 - Opening Expert Report of Dr. Robert Colwell ("Dr. Colwell Report")
2023.12.20 - Opening Expert Report of Mike Chen ("Dr. Chen Report")
2024.02.27 - Rebuttal Expert Report of Dr. Robert Colwell ("Dr. Colwell Rebuttal Report")
Bos Dep. Exhibit 16

4. Produced Documents

ARM_00011869
QCARM_0006340
QCARM_0360587
QCARM_3405530
QCARM_3433989
QCARM_3942991
QCARM_3972000
QCARM_7482214
QCARM_7607157
QSC2ARMVQC0000248 – QSC2ARMVQC0000262
QSC2ARMVQC0000263 - QSC2ARMVQC0000277

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

QSC2ARMVQC0000278 - QSC2ARMVQC0000292
QSC2ARMVQC0000293 - QSC2ARMVQC0000307
QSC2ARMVQC0000308 - QSC2ARMVQC0000332
QSC2ARMVQC0000333 - QSC2ARMVQC0000338
QSC2ARMVQC0000339 - QSC2ARMVQC0000363
QSC2ARMVQC0000364 - QSC2ARMVQC0000387
QSC2ARMVQC0000388 - QSC2ARMVQC0000417
QSC2ARMVQC0000418 - QSC2ARMVQC0000442
QSC2ARMVQC0000443 - QSC2ARMVQC0000472
QSC2ARMVQC0000473 - QSC2ARMVQC0000487
QSC2ARMVQC0000488 - QSC2ARMVQC0000525
QSC2ARMVQC0000526 - QSC2ARMVQC0000544
QSC2ARMVQC0000545 - QSC2ARMVQC0000568
QSC2ARMVQC0000569 - QSC2ARMVQC0000574
QSC2ARMVQC0000575 - QSC2ARMVQC0000585

5. Publicly Available Documents

https://documentation-service.arm.com/static/644a406baa78c007af74e6fd?token= (last visited March 10, 2024, also produced at ARM 00011869-24808 at 11905)
https://documentation-service.arm.com/static/64dcdf2a934840622b3496c9?token= (last visited February 4, 2024)
https://developer.arm.com/documentation/102404/latest (last visited March 10, 2024)
ARM Developer website under Exploration Tools at https://developer.arm.com/downloads/-/exploration-tools (last visited March 19, 2024)
https://github.com/alastairreid/mra_tools (last visited March 19, 2024)

6. Documents cited by Chen:

QSC1ARMVQC0000001 – QSC1ARMVQC0000021
Bos Deposition Transcript dated November 29, 2023.
Stephen Nellis, Former Apple chip executives found company to take on Intel, AMD, REUTERS, https://www.reuters.com/article/us-nuvia-techidUSKBN1XP19V/?taid=5dcefd5c1dd1a30001b949f0&utm_campaign=trueAnthem%3A+Trending+Content&utm_medium=trueAnthem&utm_source=twitter (last visited March 25, 2024).

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
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QUALCOMM, Press Release: Qualcomm to Acquire NUVIA (Jan. 21, 2021), https://www.qualcomm.com/news/releases/2021/01/qualcomm-acquire-nuvia (last visited March 25, 2024).
QUALCOMM, Press Note: Qualcomm Completes Acquisition of NUVIA (Mar. 15, 2021), https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia (last visited March 25, 2024).
ARM_00099622
ARM_01324149
QSC1ARMVQC0000001 – QSC1ARMVQC0000021
QSC1ARMVQC0000022 – QSC1ARMVQC0000064
QSC1ARMVQC0000065 – QSC1ARMVQC0000145
QSC1ARMVQC0000146 – QSC1ARMVQC0000188
QSC1ARMVQC0000189 – QSC1ARMVQC0000259
QCARM_0169739
QCARM_0181949
QCARM_0325086
QCARM_0325371
QCARM_0332617
QCARM_0490031
QCARM_0490329
QCARM_2402257
QCARM_2402586
QCARM_2412688
QCARM_2540979
QCARM_2551809
QCARM_3041647
QCARM_3087396
QCARM_3087757
QCARM_3087992
QCARM_3088245
QCARM_3088553
QCARM_3088937
QCARM_3089361

7. Documents cited by Colwell:

Appendix A to Reply Expert Report of Dr. Murali Annavaram

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

Arm Ltd. v. Qualcomm Inc. et al., No. 1-22-cv-001146 MN (D. Del.): ECF No. 1, Complaint, dated August 31, 2022.
ECF No. 1, Complaint, dated August 31, 2022
ECF No. 12, SEALED Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Counterclaim, dated September 30, 2022.
ECF No. 18, SEALED Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Amended Counterclaim, dated October 26, 2022.
ECF No. 23, SEALED Plaintiff Arm Ltd.'s Answer and Affirmative Defenses to Defendants Qualcomm Inc., Qualcomm Technologies, Inc., and Nuvia, Inc.'s Amended Counterclaim, dated November 15, 2022.
Defendants' Response and Objections to Plaintiff's First Set of Interrogatories (Nos. 1-13), dated February 27, 2023.
Gulati Deposition Transcript dated October 12, 2023.
Amon Deposition Transcript dated November 15, 2023.
Trivedi Deposition Transcript dated October 25, 2023.
Williams Deposition Transcript dated November 3, 2023.
Asghar Deposition Transcript dated November 8, 2023.
Grisenthwaite Deposition Transcript dated November 15, 2023.
Bos Deposition Transcript dated November 29, 2023.
Thompson Deposition Transcript dated November 28, 2023.
Sharma Deposition Transcript dated October 27, 2023.
Kanapathipillai Deposition Transcript dated December 1, 2023.
Correspondence dated 10/26/2023 email from J. Braly to J. Li.
Correspondence dated 9/12/2023 email from J. Braly to F. Patel
Chen Report
ARM_00001456
ARM_00002045
ARM_00002516
ARM_00002654
ARM_00002988
ARM_00038568
ARM_00038935
ARM_00039434
ARM_00040395
ARM_00042794
ARM_00045395

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
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ARM_00051126
ARM_00057230
ARM_00059183
ARM_00099622
ARM_01216002
ARM_01230173
ARM_01309676
ARM_01324149
QCARM_0000864
QCARM_0002581
QCARM_0027987
QCARM_0169739
QCARM_0181949
QCARM_0182011
QCARM_0190735
QCARM_0325086
QCARM_0325371
QCARM_0337839
QCARM_0338297
QCARM_0338883
QCARM_0339310
QCARM_0339630
QCARM_0339647
QCARM_0339935
QCARM_0360587
QCARM_0490031
QCARM_0490329
QCARM_0550518
QCARM_0557206
QCARM_2402257
QCARM_2402586
QCARM_2414840
QCARM_2423540

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INFORMATION SUBJECT TO PROTECTIVE ORDER

QCARM_2540979
QCARM_3041647
QCARM_3087396
QCARM_3087757
QCARM_3087992
QCARM_3088245
QCARM_3088553
QCARM_3088937
QCARM_3089361
QCARM_3314892
QCARM_3433989
QCARM_3443782
QCARM_3451883
QCARM_3520804
QCARM_3534786
QCARM_3535060
QCARM_3535496
QCARM_3535531
QCARM_3535726
QCARM_3536628
QCARM_3536689
QCARM_3861394
QCARM_3972000
QCARM_3972047
QCARM_7403869
US Patent No. 9,753,724
US Patent No. 9,760,374
US Patent No. 8,566,563
Gavin Divers, Gaming Industry Dominates as the Highest-Grossing Entertainment Industry, GAMERHUB (Jan. 24, 2023), https://gamerhub.co.uk/gaming-industry-dominates-as-the-highest-grossing-entertainment-industry/ (last visited March 25, 2024).
Matthew Connatser, ARM vs. RISC-V: Is one better than the other? DIGITALTRENDS (May 31, 2022), https://www.digitaltrends.com/computing/arm-vs-risc-v/ (last visited March 25, 2024).
Arm Holdings plc., 95,500,000 American Depositary Shares (Representing 95,500,000

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

Ordinary Shares) (Form SEC-424B4) (September 13, 2023), https://www.sec.gov/Archives/edgar/data/1973239/000119312523235320/d550931d424b4.htm (last visited March 25, 2024).
ARM, https://www.arm.com/products/development-tools (last visited March 25, 2024).
ARM, Arm CPU Architecture: A Foundation for Computing Everywhere, https://www.arm.com/architecture/cpu (last visited March 25, 2024).
ARM, https://www.arm.com/products (last visited March 25, 2024).
ARM, https://www.arm.com/product-filter?families=cortex-a&showall=true (last visited March 25, 2024).
ARM, https://www.arm.com/product-filter?families=cortex-a&showall=true (last visited March 25, 2024).
ARM, https://www.arm.com/products/silicon-ip-cpu?families=cortexm&showall=true (last visited March 25, 2024).
ARM, https://www.arm.com/markets/consumer-technologies (last visited March 25, 2024).
ARM, https://www.arm.com/markets/automotive (last visited March 25, 2024).
ARM, https://www.arm.com/markets/computing-infrastructure (last visited March 25, 2024).
ARM, https://www.arm.com/markets/iot (last visited March 25, 2024).
Qualcomm, Annual Report (Form 10-K) (September 26, 2021), https://www.sec.gov/Archives/edgar/data/804328/000172894921000076/qcom-20210926.htm (last visited March 25, 2024).
Introducing the Qualcomm Falkor CPU core: purpose-built for cloud workloads, QUALCOMM, OnQ Blog (Aug. 19, 2017), https://www.qualcomm.com/news/onq/2017/08/introducing-qualcomm-falkor-cpu-core-purpose-built-cloud-workloads#:~:text=ARM%20provides%20an%20ideal%20foundation,emerging%20demands%20of%20highly%2Dscalable%2C (last visited March 25, 2024).
James Morra, With Future Uncertain, Qualcomm Loses Data Center President, ELECTRICDESIGN (May 22, 2018), https://www.electronicdesign.com/markets/automation/article/21806539/with-futureuncertain-qualcomm-loses-data-center-president (last visited March 25, 2024).
Danny Crichton, Three of Apple and Google's former star chip designers launch NUVIA with \$53M in series A funding, TECHCRUNCH (Nov. 15, 2019), https://techcrunch.com/2019/11/15/three-of-apple-and-googles-former-star-chip-designers-launch-nuvia-with-53m-in-series-a-funding/ (last visited March 25, 2024).
Dean Takahashi, Nuvia raises \$240 million to design Arm-based CPUs for datacenters, VENTUREBEAT (Sept. 24, 2020), https://venturebeat.com/business/nuvia-raises-240-million-to-design-arm-based-cpus-for-datacenters/ (last visited March 25, 2024).
William Gayde, How Arm Came to Dominate the Mobile Market, TECHSPOT (Dec. 24, 2020), https://www.techspot.com/article/1989-arm-inside/ (last visited March 25, 2024).
APPLE, Press Release: Apple unleashes M1 (Nov. 10, 2020), https://www.apple.com/newsroom/2020/11/apple-unleashes-m1/ (last visited March 25, 2024).
Nermin Hajdarbegović, Apple M1 Processor Overview and Compatibility, TOPTAL, https://www.toptal.com/apple/apple-m1-processor-compatibility-overview (last visited March 25, 2024).

EXPERT REPORT OF MURALI ANNAVARAM CONTAINS CONFIDENTIAL BUSINESS
INFORMATION SUBJECT TO PROTECTIVE ORDER

Stephen Shankland, Apple M1 Macs are kick-starting a new Arm-based PC era. Arm's CEO is optimistic, CNET (Jan. 13, 2021), https://www.cnet.com/tech/computing/apple-m1-macs-are-kick-starting-new-arm-based-pc-era-arm-ceo-is-optimistic/ (last visited March 25, 2024).
Urvish Mahajan, Apple M1 — How Apple Silicon Changed the PC Industry, MEDIUM (Sep. 23, 2023), https://medium.com/@urvishmahajan/apple-m1-how-apple-changed-the-pc-industry-4a7c3c8a3d57 (last visited March 25, 2024).
Katie Tarasov, How Arm is gaining chip dominance with its architecture in Apple, Nvidia, AMD, Amazon, Qualcomm and more, CNBC (Nov. 9, 2023), https://www.cnbc.com/2023/11/09/how-arm-gained-chip-dominance-with-apple-nvidia-amazon-and-qualcomm.html (last visited March 25, 2024).
Mark Hachman, Qualcomm dubs Nuvia CPU '██████████' on track for 2023, PCWORLD (Nov. 17, 2022), https://www.pcworld.com/article/1382740/qualcomm-dubs-nuvia-██████████-on-track-for-2023.html (last visited March 25, 2024).
QUALCOMM, Press Note: Qualcomm Unleashes Snapdragon X Elite: The AI Super-Charged Platform to Revolutionize the PC (Oct. 24, 2023), https://www.qualcomm.com/news/releases/2023/10/qualcomm-unleashes-snapdragon-x-elite--the-ai-super-charged-plat (last visited March 25, 2024).
Hassan Mujtaba, Apple M1 ARM 8 Core CPU Is Faster Than Intel & AMD's Fastest 8 Core Chips in Single-Core Performance Benchmark, WCCFTECH (March 25, 2021), https://wccfttech.com/apple-m1-arm-8-core-cpu-faster-intel-amd-fastest-8-core-chips-single-core-performance/ (last visited March 25, 2024).
David Coffin et al., The Roadblocks of the COVID-19 Pandemic in the U.S. Automotive Industry, U.S. INTERNATIONAL TRADE COMMISSION (USITC) (June 2022), https://www.usitc.gov/publications/332/working_papers/the_roadblocks_of_the_covid-19_pandemic_in_the_automotive_industry_final.pdf (last visited March 25, 2024).
NVIDIA and Qualcomm ARM Up Against Competitors, BERKELEY DESIGN TECHNOLOGY, INC. (October 18, 2011), https://www.bdti.com/InsideDSP/2011/10/20/NvidiaQualcomm (last visited March 25, 2024).
The Microprocessor Chip: Design Guidelines, Functionality, and Characteristics, CADENCE PCB SOLUTIONS (2020), https://resources.pcb.cadence.com/blog/2020-the-microprocessor-chip-design-guidelines-functionality-and-characteristics (last visited March 25, 2024).
Matthew Connaster, Nuvia Announces CPI Codenamed Phoenix, Promises to Deliver Leading Single Threaded Performance, ADORED TV (August 11, 2020), https://adoredtv.com/nuvia-announces-cpu-codenamed-phoenix-promises-to-deliver-leading-single-threaded-performance/ (last visited March 25, 2024).
Itamar Turner-Trauring, Please stop writing shell scripts, Python Speed (Mar. 24, 2022), https://pythonspeed.com/articles/shell-scripts/ (last visited March 25, 2024).
Arnold Robbins, Nelson H. F. Beebe, Classic Shell Scripting, xiii (Tatiana Apandi et al. eds., 2005).
Alfredo V. Aho, Brian W. Kernighan, Peter J. Weinberger, The AWK Programming Language (Greg Doench ed., 2nd ed. 2023).

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ARM LTD.,

Plaintiff,

v.

QUALCOMM INC., QUALCOMM
TECHNOLOGIES, INC. and NUVIA, INC.,

Defendants

C.A. No. 22-1146 (MN)

REPLY EXPERT REPORT OF DR. MURALI ANNAVARAM

APPENDIX

B

Appendix B contains the following documents, which have been designated as “HIGHLY CONFIDENTIAL – SOURCE CODE – ATTORNEYS’ EYES ONLY” pursuant to the Protective Order in this action.

BEGBATES	ENDBATES
QSC2ARMVQC0000248	QSC2ARMVQC0000262
QSC2ARMVQC0000263	QSC2ARMVQC0000277
QSC2ARMVQC0000278	QSC2ARMVQC0000292
QSC2ARMVQC0000293	QSC2ARMVQC0000307
QSC2ARMVQC0000308	QSC2ARMVQC0000332
QSC2ARMVQC0000333	QSC2ARMVQC0000338
QSC2ARMVQC0000339	QSC2ARMVQC0000363
QSC2ARMVQC0000364	QSC2ARMVQC0000387
QSC2ARMVQC0000388	QSC2ARMVQC0000417
QSC2ARMVQC0000418	QSC2ARMVQC0000442
QSC2ARMVQC0000443	QSC2ARMVQC0000472
QSC2ARMVQC0000473	QSC2ARMVQC0000487
QSC2ARMVQC0000488	QSC2ARMVQC0000525
QSC2ARMVQC0000526	QSC2ARMVQC0000544
QSC2ARMVQC0000545	QSC2ARMVQC0000568
QSC2ARMVQC0000569	QSC2ARMVQC0000574
QSC2ARMVQC0000575	QSC2ARMVQC0000585

Pursuant to the Protective Order, a printed copy of the above-listed documents is being sent via FedEx First Overnight Delivery, Tracking Number 7756 8445 1991 to:

David Nathaniel Tan
MORRISON & FOERSTER LLP
2100 L Street, NW
Suite 900
Washington, D.C., 20037
Phone: (202) 887-1500

Exhibit 13

**United States District Court
District of Delaware
Civil Action No. 01:22-cv-01146-MN**

**Qualcomm Inc.,
Qualcomm Technologies, Inc., and
NuVia, Inc.**

v.

Arm Ltd.

**Expert Report of Patrick F. Kennedy, Ph.D.
May 20, 2024**

QUALCOMM INC., QUALCOMM TECHNOLOGIES, INC., AND NUVIA, INC. v. ARM LTD.

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I. INTRODUCTION

1. I have been retained by Counsel representing Qualcomm Inc., Qualcomm Technologies, Inc. (both Qualcomm entities are referred to in this report as “Qualcomm”), and NuVia, Inc. (“Nuvia”) (collectively referred to as the “Counterclaim-Plaintiffs”) to evaluate the counterclaims asserted by Counterclaim-Plaintiffs for Arm Ltd.’s (“Arm” or “Counterclaim-Defendant”) alleged wrongful conduct described in Counterclaim-Plaintiffs’ second amended counterclaims.¹ The purpose of my report is to disclose my professional background and experience, the materials subject to my review, and my expert opinions associated with the Counterclaim-Plaintiffs’ counterclaims regarding damages in this matter.

2. Specifically, this report provides my affirmative opinions of the damages resulting from Counterclaim-Defendant’s alleged harmful acts, which are set forth in Counterclaim-Plaintiffs’ second amended counterclaims.² This report summarizes my opinions given the information available to me at this time. If I receive additional relevant information, I reserve the right to prepare a supplemental report incorporating this new information.

II. QUALIFICATIONS AND TESTIMONY

3. I am an economist and Managing Director with Stout Risius Ross, LLC (“Stout”). Stout is a professional services firm that provides independent expert testimony, analysis, valuation, and strategic consulting services to clients, along with financial services such as investment banking, advisory, and valuation services. I hold a bachelor’s degree in Economics

¹ Defendants’ Answer and Defenses to Plaintiff’s Complaint and Jury Demand and Defendants’ Second Amended Counterclaims, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.*, Civil Action No. 1:22-cv-01146-MN, March 13, 2024, pp. 70-86.

² Defendants’ Answer and Defenses to Plaintiff’s Complaint and Jury Demand and Defendants’ Second Amended Counterclaims, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.*, Civil Action No. 1:22-cv-01146-MN, March 13, 2024, pp. 70-86.

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from the University of California, San Diego and a doctorate in Economics from Stanford University. Prior to joining Stout, I was a Managing Director with Torrey Partners, a Managing Director with LECG, a Shareholder with Mack|Barclay, Inc., a Director of Economic Research with International Securities Group, and an Economist with the Board of Governors of the Federal Reserve System in Washington, D.C. Attached at **Exhibit A** is my curriculum vitae, which summarizes my educational and professional background.

4. My professional experience includes assessing economic damages within and outside of the litigation environment; many of these matters have required my presentation of qualified expert testimony in state and federal courts. Attached at **Exhibit B** is a list of my deposition, arbitration, and trial testimony for the last five years.

5. In this case, Stout is being compensated for my analysis and testimony at a rate of \$850 per hour. In preparing the analysis reflected in this report, I have been assisted by consultants employed by Stout, who performed work under my direction. My compensation is not contingent upon the outcome of this litigation or my opinions.

III. MATERIALS CONSIDERED

6. In connection with my continuing review and analysis, I have considered, reviewed, and relied upon materials and information that may be cited directly in this report and are generally summarized at the attached **Exhibit C**. This information includes pleadings, depositions, documents produced by the parties, third party information, relevant case law, the expert report of Dr. Murali Annavaram, the Counterclaim-Plaintiffs' retained technical expert, and interviews with Robert Pflederer, Member of Technical Staff at Qualcomm and Ram Srinivasan, Senior

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Director at Qualcomm,³ all of which I incorporate herein by reference, even if not specifically stated.

IV. BACKGROUND

7. In my opening report dated February 27, 2024 (“Kennedy Opening Report”), I provide a background discussion of the relevant parties, relevant agreements between the parties, industry information and other relevant information in this matter, which I incorporate herein by reference. In the following sections, I provide additional background relevant to Counterclaim-Plaintiffs’ counterclaims.

A. Qualcomm’s and Nuvia’s Counterclaims

8. Based on my review of the Counterclaim-Plaintiffs’ second amended counterclaims filed on March 13, 2024, I understand that Counterclaim-Plaintiffs allege that ARM failed to cease use of certain Nuvia Confidential Information after the termination of the Nuvia Architecture License Agreement (“ALA”) and the Nuvia Technology License Agreement (“TLA”).⁴

9. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

10. [REDACTED]

[REDACTED]

³ I understand that Mr. Pflederer and Mr. Srinivasan are former employees of Nuvia.

⁴ Defendants’ Answer and Defenses to Plaintiff’s Complaint and Jury Demand and Defendants’ Second Amended Counterclaims, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.*, Civil Action No. 1:22-cv-01146-MN, March 13, 2024, pp. 73-76, and 83-86.

⁵ QCARM_0332490.

⁶ QCARM_2429058-059.

⁷ QCARM_0338297-311 at ‘308; QCARM_0337839-855 at ‘852.

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11. I understand that the Counterclaim-Plaintiffs claim that Arm breached the termination clauses in the Nuvia TLA and Nuvia ALA. Counterclaim-Plaintiffs assert damages associated with the failure to cease use of Nuvia Confidential Information, including trade secrets, as described below. Counterclaim-Plaintiffs allege that [REDACTED]

[REDACTED]

[REDACTED] Counterclaim-Plaintiffs alleged that certain features of Arm's CMN product, reflected in these documents, originated with Nuvia and therefore are considered to be Nuvia Confidential Information, as well as Nuvia's trade secrets, that Arm should have ceased using due to the aforementioned termination by Arm.⁹ Counterclaim-Plaintiffs further assert that Arm has incorporated features that Counterclaim-Plaintiffs assert are Nuvia Confidential Information into Arm products that are licensed or sold to third parties, despite Arm's April 29, 2022 acknowledgment of its contractual obligations to discontinue using Nuvia Confidential Information and Arm's representation to the Court that it certified its compliance with the termination provision on April 1, 2022.¹⁰

⁸ See, e.g., ARM_01435455-456.

⁹ Defendants' Responses and Objections to Plaintiff's Third Set of Interrogatories (Nos. 26-29), May 7, 2024, pp. 10-11.

¹⁰ Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Second Amended Counterclaims, *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.*, Civil Action No. 1:22-cv-01146-MN, March 13, 2024, p. 75; Defendants' Responses and Objections to Plaintiff's Third Set of Interrogatories (Nos. 26-29), May 7, 2024, pp. 12-13.

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B. Coherent Mesh Network

12. I understand that Arm's coherent mesh network products are at-issue in this matter.¹¹ I briefly describe these products below based on documents produced in this matter and my own public research.

13. I understand that the coherent mesh network ("CMN") links processor cores, system level caches and accelerators within a System-on-Chip ("SoC") to shared memory resources and input/output ("I/O").¹² I understand that [REDACTED]

[REDACTED]¹³ According to Arm, "[c]reating a high-speed, high-performance, highly scalable fabric that can be readily adopted by semiconductor designers and equipment manufacturers [...] reduces design complexity and time to market. The end results are improved overall performance, reduced power consumption, fewer data bottlenecks, and reduced cost."¹⁴

14. In September 2016, Arm introduced the CMN-600, its first-generation coherent mesh network for SoC technologies in the server market.¹⁵ In June 2019,¹⁶ Arm introduced CMN-650, also known as CMN-Rhodes,¹⁷ a scalable, configurable interconnect with a customizable mesh topology that is designed for use in "high-end networking and enterprise compute applications."¹⁸

¹¹ Information provided by Counsel.

¹² <<https://www.arm.com/products/silicon-ip-system/corelink-interconnect/cmn-700>>; <https://armkeil.blob.core.windows.net/developer/Files/pdf/solution_overview-corelink-cmn-700.pdf>.

¹³ QCARM_7389922-940 at '926.

¹⁴ <https://armkeil.blob.core.windows.net/developer/Files/pdf/solution_overview-corelink-cmn-700.pdf>.

¹⁵ <<https://newsroom.arm.com/news/arm-system-ip-boosts-soc-performance-from-edge-to-cloud>>.

¹⁶ ARM_01462325-360 at '332.

¹⁷ Arm Neoverse CMN-650 Coherent Mesh Network Technical Reference Manual, Revision r2p0, p. 1012; <<https://developer.arm.com/documentation/101481/0200/?lang=en>>.

¹⁸ Arm Neoverse CMN-650 Coherent Mesh Network Technical Reference Manual, Revision r2p0, p. 20.

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15. In April 2021, Arm announced the next-generation CMN product, the CMN-700 (also known as CMN-Kampos).¹⁹ Subsequently, Arm released different versions of CMN-Kampos as shown in the following chart.²⁰

Figure 1: CMN-Kampos Release History

Kampos - Neoverse CMN-700 - PL624			
■	r0p0-00lac0	23 Dec 2020	v1 PEN/SDEN (empty)
■	r0p0-00lac1	04 May 2021	v2 PEN/SDEN only
■	r1p0-00lac0	24 Jun 2021	
■	r1p0-00lac0	01 Oct 2021	v3 PEN/ SDEN only ASM116874
■	r2p0-00lac0	18 Nov 2021	
■	r2p0-00lac0	07 Jan 2022	v4 PEN/SDEN only ASM117840
■	r2p0-00lac1	17 Feb 2022	v5 PEN/SDEN only ASM118727
■	r2p0-00lac2	14 Jul 2022	v6 PEN/SDEN only ASM120439
■	r3p0-00eac0	07 Sep 2022	v7 ASM120823
■	r3p0-00eac1	11 Jan 2023	v8 ASM122366
■	r3p0-00eac2	20 Mar 2023	v8 ASM122918
■	r3p1-00eac0	28 Mar 2023	ASM121472 AWS-only release with no Errata
■	r3p0-00eac3	01 May 2023	v9 ASM123341
■	r3p2-00eac0	30 Jun 2023	v10 ASM123861
■	r3p2-01eac0	06 Jul 2023	v10 ASM124002
■	r3p2-01eac1	24 Jul 2023	v10 ASM124138
■	r3p3-00eac0	18 Aug 2023	v11 ASM124253
■	r3p3-00eac1	24 Aug 2023	v12 ASM124437
■	r3p3-00eac2	15 Sep 2023	v13 ASM124580
■	r3p3-00eac3	17 Oct 2023	v14 ASM124925
■	r3p3-00eac4	01 Dec 2023	v15 ASM125436
■	r3p3-00eac5	04 Apr 2024	v16 ASM126536

16. On its website, Arm compares CMN-600 to CMN-700, and I understand that the CMN-700 offers improvements in scalability, performance, and flexibility as summarized in the figure below.²¹

¹⁹ <<https://newsroom.arm.com/news/transforming-compute-for-next-generation-infrastructure>>; ARM_01462325-360 at '327.

²⁰ ARM_01465116. Per Arm, LAC refers to limited access and EAC refers to early access. <<https://web.archive.org/web/20220522200303/https://community.arm.com/arm-community-blogs/b/architectures-and-processors-blog/posts/system-validation-at-arm-enabling-our-partners-to-build-better-systems>>.

²¹ <https://armkeil.blob.core.windows.net/developer/Files/pdf/solution_overview-corelink-cmn-700.pdf>. ARM_01462325-360 at '346.

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[REDACTED]

17. In [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²² ARM_01462325-360 at '351.

²³ ARM_01462325-360 at '350.

²⁴ ARM_01462325-360 at '351.

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18. Per Arm's website, Arm states that the CMN-700 "is designed for intelligent connected systems across a wide range of applications, including networking infrastructure, storage, server, HPC, automotive, and industrial solutions."²⁵

19. In February 2024, Arm announced CMN S3, its latest-generation CMN.²⁶ I understand the CMN S3 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

20. In addition, I understand that certain Arm technologies such as the Memory Management Unit ("MMU")³⁰ and NCI-Booker³¹ can be used with Arm's CMN products.³²

²⁵ <<https://www.arm.com/products/silicon-ip-system/corelink-interconnect/cmn-700>>.

²⁶ <<https://community.arm.com/arm-community-blogs/b/infrastructure-solutions-blog/posts/arm-neoverse-s3-enables-chiplets-and-leading-memory-and-io>>.

²⁷ <<https://developer.arm.com/Processors/Neoverse%20CMN%20S3>>; <<https://community.arm.com/arm-community-blogs/b/infrastructure-solutions-blog/posts/arm-neoverse-s3-enables-chiplets-and-leading-memory-and-io>>.

²⁸ <<https://www.arm.com/products/silicon-ip-system/neoverse-interconnect/cmn-s3>>.

²⁹ <<https://community.arm.com/arm-community-blogs/b/infrastructure-solutions-blog/posts/arm-neoverse-s3-enables-chiplets-and-leading-memory-and-io>>.

³⁰ Arm Neoverse CMN-700 Coherent Mesh Network Technical Reference Manual, Revision r3p2, p. 17. I understand that a Memory Management Unit ("MMU") involves both memory protection and address translation. I also understand that the MMU translates virtual addresses to physical addresses, and controls accesses to and from the external memory.

<<https://developer.arm.com/documentation/100310/0100/introduction/about-the-mmu-600>>.

According to Arm's website, the MMU-700 (also known as MMU-Woof) is a system-level memory management unit ("SMMU") that translates an input address to an output address.

<<https://developer.arm.com/Processors/CoreLink%20MMU-700#Technical-Specifications>>.

³¹ <<https://community.arm.com/arm-community-blogs/b/architectures-and-processors-blog/posts/new-arm-interconnect>>. NCI-Booker (renamed to NI-700) is a network-on-chip ("NoC") interconnect that enables data transfers among an SoC's cores. I understand the NI-700 is comprised of functional units, which process and route network traffic across the NI-700. Arm Corelink NI-700 Network-on-Chip Interconnect Technical Reference Manual, Revision r2p0, pp. 1, 2-33, Appx-B-349; <<https://community.arm.com/arm-community-blogs/b/architectures-and-processors-blog/posts/new-arm-interconnect>>; <<https://www.allaboutcircuits.com/news/why-socs-need-nocs-network-on-chip-and-future-computing/>>.

³² ARM_SC_1_00001346-377 at '351.

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C. Arm / Nuvia License Discussions Related to CMN

21. Prior to the execution of the Nuvia TLA and Nuvia ALA, Arm and Nuvia engaged in licensing discussions concerning, but not limited to, CMN that Nuvia sought to license.

22. In [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

23. In addition, [REDACTED]

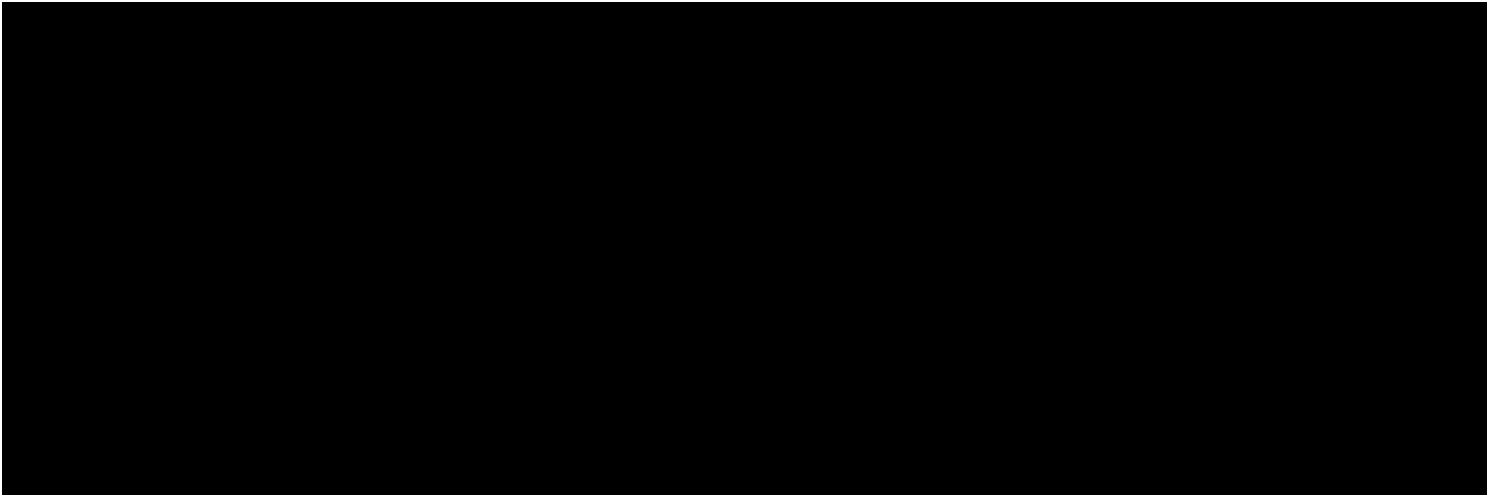
[REDACTED]

³³ ARM_01437222-233 at '222, '225, '230.

³⁴ ARM_00082871-873; ARM_00082874, tab "Pricing Model."

³⁵ ARM_00082874, tab "Licensing."

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24. Based on documents produced in this matter, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

25. Ultimately, I understand that Nuvia licensed CMN and other Arm technologies as a part of its TLA with Arm.

³⁶ ARM_01425194-198 at '197-198.

³⁷ ARM_01425194-198 at '197-198.

³⁸ ARM_00037458-461 at '459.

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D. Nuvia's and Qualcomm's Agreements with Arm for CMN**i. Arm / Nuvia Agreements**

26. As described in greater detail in the Kennedy Opening Report, I understand that Arm licenses its intellectual property under agreements including ALAs and TLAs.³⁹ Nuvia entered into an ALA and TLA with Arm in September 2019.⁴⁰ Annex 1 of the Nuvia TLA describes Nuvia's license to Arm's CMN. I briefly describe the operative Annex and its related amendment below.⁴¹

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

³⁹ Under an ALA, Arm grants a license to distribute customized CPU designs that are compliant with the Arm ISA for a fixed architecture license fee. Arm also charges the licensee a royalty on every chip that contains the [REDACTED]. Under a TLA, Arm licenses CPU designs or other technology design to a customer in return for a fixed license fee and a per-unit royalty that vary depending on factors including the licensed Arm products, license term, and number of products the licensee makes that use Arm products. See, Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023, pp. 87, 132-133; QCARM_0275743-763 at '761-762.

⁴⁰ QCARM_0338297-311 at '297; QCARM_0337839-855 at '839.

⁴¹ I do not provide any legal opinions regarding these agreements.

⁴² ARM_01436707-716 at '707.

⁴³ ARM_01436707-716 at '707, '710.

⁴⁴ ARM_01436707-716 at '710-'711.

[illegible]

31. After Qualcomm's \$1.4 billion acquisition of Nuvia, I understand that Qualcomm and Arm entered into Annex 1 of the Qualcomm TLA on July 23, 2021 ("Qualcomm TLA Annex").⁵¹

51 QCARM 3485446-461.

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32. The Qualcomm TLA Annex provided Qualcomm a single-use license to CMN-Kampos and NCI-Booker along with other Arm technologies for a three year term.⁵² [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

E. Nuvia Confidential Information

33. I understand that the Counterclaim-Plaintiffs assert that the Nuvia Confidential Information includes, but is not limited to, features Nuvia requested, documents designated Nuvia Confidential, and information [REDACTED]

[REDACTED] In the following paragraphs, I describe the development activities related to the Nuvia Confidential Information and the relevant features found in CMN-Kampos.

i. Nuvia's Development Activities

a. Activities Prior to Nuvia ALA and Nuvia TLA

34. Prior to the execution of the Nuvia ALA and Nuvia TLA, Arm provided Nuvia access to CMN-Rhodes for evaluation purposes.⁵⁶

35. For example, on [REDACTED]

[REDACTED]

⁵² QCARM_3485446-461 at '446-447.

⁵³ QCARM_3485446-461 at '457.

⁵⁴ QCARM_3429791-872 at '819.

⁵⁵ Defendants' Responses and Objections to Plaintiff's Third Set of Interrogatories (Nos. 26-29), May 7, 2024, pp. 13-14.

⁵⁶ Deposition of Tim Herbert, October 25, 2023, pp. 84-89; Herbert Deposition Exhibit 3, ARM_00002166-167.

⁵⁷ Herbert Deposition Exhibit 2, ARM_00057594-598 at '594-595.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

37. As part of its assessment of CMN, Manu Gulati, co-founder of Nuvia, explained that [REDACTED]

[REDACTED]

⁵⁸ Herbert Deposition Exhibit 2, ARM_00057594-598 at '594-595.
⁵⁹ Deposition of Tim Herbert, October 25, 2023, pp. 84-89; Herbert Deposition Exhibit 3, ARM_00002166-167.
⁶⁰ ARM_01437222-233 at '224.
⁶¹ ARM_01291691-745 at '694.
⁶² ARM_01437222-233 at '224.

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[REDACTED]

38. During an Arm and Nuvia meeting [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

39. Thereafter, Dermot O'Driscoll, then Vice President of Marketing of Infrastructure at Arm,⁶⁷ provided [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

40. In response to Mr. O'Driscoll, Mr. Lepinski stated:⁷¹

⁶³ ARM_01437178-179 at '178.

⁶⁴ ARM_01437178-179 at '178.

⁶⁵ ARM_01437214-216 at '214.

⁶⁶ ARM_01437214-216 at '214-215.

⁶⁷ Deposition of Tim Herbert, October 25, 2023, p. 60.

⁶⁸ ARM_00049072-076.

⁶⁹ ARM_00049072-076 at '072.

⁷⁰ ARM_00049072-076 at '072.

⁷¹ ARM_00049072-076 at '072.

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[REDACTED]

b. Activities after Nuvia TLA and Nuvia ALA

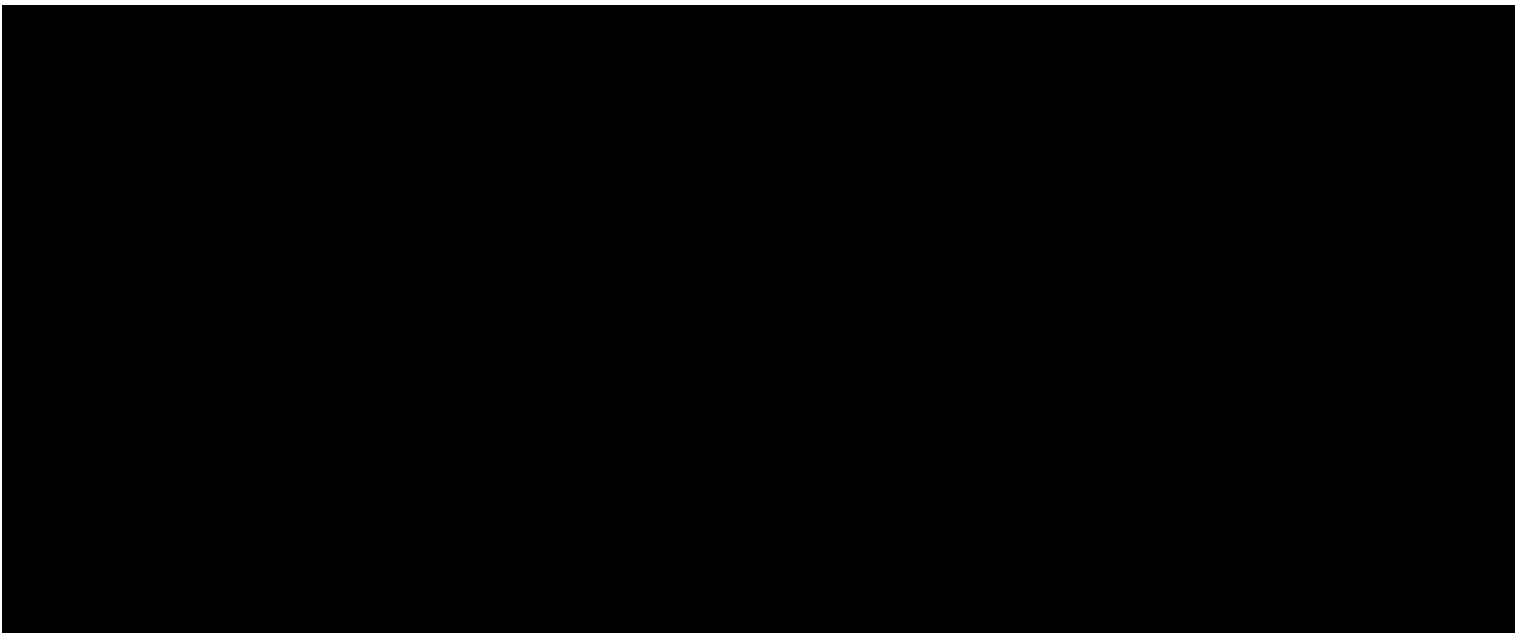
41. Following the execution of the Nuvia ALA and Nuvia TLA, Arm and Nuvia held discussions where Nuvia requested features and enhancements for the CMN. [REDACTED]

[REDACTED]

42. For example, [REDACTED]
[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]
[REDACTED] [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] [REDACTED]
[REDACTED]
[REDACTED]

⁷² [REDACTED]
⁷³ QCARM_3819785.
⁷⁴ QCARM_3819786-787 at '786.
⁷⁵ QCARM_3819786-787 at '787.
⁷⁶ ARM_01291691-745 at '694.

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43. As shown above, [REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

44. Accordingly, I understand that Nuvia conceptualized, tested, requested and provided Nuvia Confidential Information to Arm to improve its CMN product.⁸⁰

45. For example, [REDACTED]

[REDACTED]

⁷⁷ QCARM_3819786-787 at '787.

⁷⁸ [REDACTED]

⁸⁰ Arm Ltd.'s Objections and Responses to Qualcomm's Fifth Set of Interrogatories (Nos. 26-28), April 29, 2024, p. 4; ARM_01435466.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

46. Further, Mark Werkheiser, engineering fellow at Arm,⁸³ testified that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

- I [REDACTED]
- I [REDACTED]
- I [REDACTED]
- I [REDACTED]
- I [REDACTED]
- I [REDACTED]

47. Similarly, [REDACTED]

[REDACTED]

⁸¹ QCARM_3862422; QCARM_3862424-425. See also QCARM_7629881 and QCARM_7497374.
⁸² QCARM_3862424-425 at '424.
⁸³ Deposition of Mark Werkheiser, December 7, 2023, pp. 8-9.
⁸⁴ Deposition of Mark Werkheiser, December 7, 2023, p. 50.
⁸⁵ QCARM_7634056, tab "Tracker"; QCARM_7389941-90081 at '89941-90047.
⁸⁶ QCARM_7634056, tab "Tracker."
⁸⁷ QCARM_7389941-90081 at '89942-90047.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁹⁷ QCARM_7389922-940 at '927; QCARM_3919919-921.

⁹⁸ QCARM_7635065, tab "Features"; QCARM_7646660, tab "Sheet1."

⁹⁹ I understand that RTL is a type of code and is Arm's standard delivery model for soft deliverables, meaning it is a set of code that requires the end customer to perform work to put the code onto a chip. Deposition of Rene Haas, December 12, 2023, p. 40; [REDACTED]

[REDACTED] I further understand pushing code means adding elements to computer code and sending updates to a local repository. <<https://www.computerhope.com/jargon/p/push.htm>>.

¹⁰⁰ QCARM_7635065, tab "Features."

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ii. At-Issue CMN Features

49. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

V. DAMAGES ANALYSIS

A. Damages Framework

50. I understand from counsel that Counterclaim-Plaintiffs seek damages related to Arm's alleged breach and the benefits Arm received as a result of the alleged breach. Counterclaim-Plaintiffs claim that Arm failed to cease use of the Nuvia Confidential Information following Arm's termination of the Nuvia ALA and Nuvia TLA. Counterclaim-Plaintiffs assert that Arm benefits from use of the Nuvia Confidential Information by generating licensing fees and royalties by licensing Nuvia Confidential Information under various agreements to Qualcomm's competitors.

51. In the but-for world, where it is assumed that Arm would have ceased using the Nuvia Confidential Information, Arm would have had to incur expenses and development time to

¹⁰¹ I understand that later versions of Arm's CMN products, [REDACTED] have continued to implement the Nuvia requested features. When I refer to "CMN-Kampos" for the remainder of this report, I intend it to include versions of Arm's CMN products post CMN-Kampos that implemented those features. Opening Expert Report of Dr. Murali Annavaram Regarding Qualcomm's Counterclaim, May 20, 2024, Sections II and V.

¹⁰² For example in an Arm Interrogatory Response, [REDACTED] Arm Ltd.'s Objections and Responses to Qualcomm's Fifth Set of Interrogatories (Nos. 26-28), April 29, 2024, p. 9. *See also* Defendants' Responses and Objections to Plaintiff's Third Set of Interrogatories (Nos. 26-29), May 7, 2024, pp. 14-15.

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duplicate the efforts that Arm had previously undertaken in developing the Nuvia Confidential Information and associated At-Issue CMN Features. Further, during this development time or head start period, Arm would have benefited from receiving licensing fees and royalties related to the At-Issue CMN Features. Arm therefore benefited through the receipt of licensing fees and royalties for CMN-Kampos technology that included value related to the Nuvia Confidential Information.

52. My analysis of the benefit that Arm gained as a result of the improper use of Nuvia Confidential Information – which Counterclaim-Plaintiffs claim as damages – is described below. Note, my analysis sets forth the methodology for identifying Counterclaim-Plaintiffs’ damages, but I am unable to complete that analysis and reach numerical conclusions due to the lack of sufficient information that was – while requested from Arm – not produced in this matter by Arm. I describe the necessary steps to conduct an analysis of Arm’s benefits from the alleged use of the Nuvia Confidential Information and I reserve the right to update my opinions if and when Arm produces responsive documentation to the Counterclaim-Plaintiffs’ requests.

B. Apportioned Fees for the At-Issue CMN Features

53. As discussed above, Counterclaim-Plaintiffs assert that Arm included Nuvia Confidential Information in CMN-Kampos. In the but-for world, Arm would have had to develop the At-Issue CMN Features following the termination, and the features would not have been available to license until the At-Issue CMN Features were independently developed by Arm. However, Arm allegedly received license fees and royalties for CMN-Kampos which are attributable, at least in part, to the Nuvia Confidential Information during the post-termination period. The license fees and royalties, attributable to the At-Issue CMN features during the period from termination up until Arm would have completed development, represent benefits Arm would not have otherwise received without the alleged breach. In this section, I describe my

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methodology to quantify the relevant license fees and royalties Arm received for CMN-Kampos during the time period when Arm would have been developing the At-Issue CMN Features.

54. Based upon the amount of time that it took Arm to develop the At-Issue CMN Features in the but-for world, Arm would have not been able to deliver the features based on the Nuvia Confidential information until a future point in time following the termination of the Nuvia TLA and Nuvia ALA. In the but-for world, Arm would have had to issue a new CMN-Kampos release to remove the At-Issue CMN Features for a period of time until it independently developed the Confidential Information and then issue a supplemental release once developed. I base my measure of Arm's benefit from failing to cease using Nuvia Confidential Information, and continuing to use and generate licensing income from such information.

55. To quantify this benefit, I consider the available information produced in this matter, though, as noted above, the Counterclaim-Plaintiffs requested information such as license agreements, licensing revenue, analyses related to licensing negotiations, list prices, and other relevant financial documents, but I understand Arm has not produced these documents. In the following paragraphs, I identify the steps to conduct an analysis and if more information becomes available, I reserve my right to update my analysis accordingly.

56. Moreover, I understand that Arm has alleged in interrogatory responses and deposition testimony that some features requested by Nuvia were already part of Arm's development plan for CMN products, and that some features were requested by other Arm partners.¹⁰³ I understand that Arm has issued supplemental interrogatory responses claiming that additional features that Arm originally deemed to have been solely requested by Nuvia were also requested by other partners.¹⁰⁴ I also understand that Arm has not produced documents sufficient

¹⁰³ Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Fifth Set of Interrogatories, May 10, 2024, pp. 17-18.

¹⁰⁴ Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Fifth Set of Interrogatories, May 10, 2024, pp. 17-18.

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to show which features requested by Nuvia were allegedly part of Arm's pre-existing CMN development roadmap or when. I understand that Arm has also not produced documents sufficient to show which features requested by Nuvia were allegedly requested by other Arm partners, or when any such request was made. I further understand that Arm has not produced documents identifying the specific partners who are claimed to have made overlapping feature requests and Arm's Rule 30(b)(6) witness, Guy Larri, [REDACTED]

i. Identification of Relevant Arm Licensees

57. The first step in my analysis is to identify the relevant licenses where Arm licensees have a license to at least CMN-Kampos. I understand that the Counterclaim-Plaintiffs requested relevant third-party license information including license agreements, proposed terms, term sheets, internal estimates, basis for license fees, and other information regarding the negotiations of such license agreements,¹⁰⁶ but it is my understanding that Arm has not produced this information. Thus, I have reviewed the available information produced in this matter to date and describe such information in the following paragraphs.

58. In [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Though it appears that [REDACTED]

¹⁰⁵ Rule 30(b)(6) Deposition of Guy Larri, May 10, 2024, p. 139.

¹⁰⁶ Arm Ltd.'s Responses and Objections to Qualcomm's Seventh Set of Requests for Production (Nos. 148-154), May 3, 2024, p. 10.

¹⁰⁷ ARM_01237494, tab "Sheet1." Rule 30(b)(6) Deposition of Guy Larri, May 10, 2024, pp. 142-143.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

59. In [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

ii. Identification of Relevant Arm Licensees' Fees and Royalties

60. The next step in my analysis is to identify the total license fees, license fees attributable to CMN-Kampos, royalties attributable to CMN-Kampos, and the terms of the agreement. Had Arm produced the relevant license agreements and analyses relating to the negotiations of such agreements [REDACTED]

[REDACTED] then I would have analyzed the fees, royalties, and terms to identify revenue specifically related to CMN-Kampos. For example, [REDACTED]

[REDACTED]

[REDACTED] In the Qualcomm TLA Annex, Arm identified [REDACTED]

[REDACTED] In addition, Arm

¹⁰⁸ ARM_01237494, tab "Sheet1"; QCARM_7389941-90081 at '90063-90078.

¹⁰⁹ ARM_01460538, tab "Sheet1." Rule 30(b)(6) Deposition of Guy Larri, May 10, 2024, pp. 144-152. Mr. Larri did not know the meaning of specific fields within this document.

¹¹⁰ ARM_00097522, tab "details."

¹¹¹ QCARM_0275743-763 at '757; ARM_00003621-624.

¹¹² QCARM_3485446-461.

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iii. Attributing Value to New Features in CMN-Kampos

61. After identifying the relevant license fees and royalties, the next step is to quantify the value attributable to the new features including the At-Issue CMN Features found in CMN-Kampos and previous technologies like CMN-Rhodes.

62. I understand that the Counterclaim-Plaintiffs requested the list prices and other documentation related to the internal valuation for CMN products by Arm, but I understand this information has not been produced.¹¹⁴ In Arm's affirmative matter, Arm produced its Price Book from April 2019, containing list price information for CMN-600 for example.¹¹⁵ Had Arm produced similar information for CMN-Rhodes and CMN-Kampos, I could compare the list price of CMN-Rhodes to the list price of CMN-Kampos to compute a price premium. This CMN-Kampos price premium would attribute value to the new features found in CMN-Kampos, including the At-Issue CMN Features. I would then apply the CMN-Kampos price premium to the CMN-Kampos license fees and royalties to determine the value attributable to the new features found in CMN-Kampos.

iv. Relative Value of the At-Issue CMN Features to New Features

63. Another step in my analysis is to consider the technical importance of the Nuvia Confidential Information relative to all of the new features found in CMN-Kampos. For example,

[REDACTED]

[REDACTED]

¹¹³ ARM_01460538, tab "Sheet1." [REDACTED] Rule 30(b)(6) Deposition of Guy Larri, May 10, 2024, pp. 144-152. When asked about this document specifically, Mr. Larri did not know the meaning of specific fields within this document.

¹¹⁴ Rule 30(b)(6) Deposition of Guy Larri, May 10, 2024, pp. 94-96.

¹¹⁵ ARM_00118835-937 at '856.

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I understand that the Counterclaim-Plaintiffs have requested the information pertaining to the identification of all features in CMN products, the benefits [REDACTED] of the features, marketing-related materials and customer surveys related to the CMN products and features, but it is my understanding that Arm has not produced sufficient, relevant information in this matter for a reasonable apportionment to be performed.

64. If sufficient information to conduct an apportionment had been produced and therefore an apportionment could be conducted, then I would apply this apportionment, which would reflect the relative value of the At-Issue CMN Features to all of the new features in CMN-Kampos, to the value attributable to the new features found in CMN Kampos, resulting in the value attributable to the At-Issue CMN Features.

v. Limiting Fees to the Relevant Time Period

65. Arm's benefit received would be limited to the time period when Arm would independently develop the At-Issue CMN Features, and I would apportion the value attributable to the At-Issue CMN Features to this time period only.

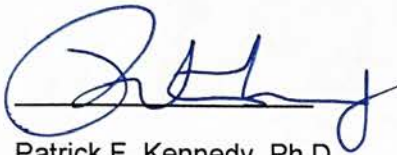
C. Conclusion

66. In sum, had Arm developed the Nuvia Confidential Information independently after the termination of the Nuvia ALA and Nuvia TLA, then Arm would not have inappropriately received more license fees and royalties than it should have. I describe my methodology above but do not provide a numerical figure for this benefit as sufficient information has not been produced and I reserve the right to update my opinions if and when information becomes available.

116 [REDACTED].

QUALCOMM INC., QUALCOMM TECHNOLOGIES, INC., AND NUVIA, INC. V. ARM LTD.

I declare under penalty of perjury that the foregoing is true and correct.



Patrick F. Kennedy, Ph.D.

Managing Director

Stout Risius Ross, LLC

5-20-24

Executed on

EXHIBIT A



Patrick F. Kennedy, PhD

Managing Director

Patrick F. Kennedy is a Managing Director at Stout based in San Diego, CA. Dr. Kennedy provides analysis, consultation, and expert opinions in business and dispute contexts. In his more than 25 years of experience, Dr. Kennedy has testified as an expert in Federal Court, the U.S. Court of Claims, Bankruptcy Court, State Court, and in private arbitrations throughout the country.

Dr. Kennedy has analyzed economic loss and damages in matters with causes of action including, but not limited to, patent, copyright, trademark and trade secret misappropriation, false advertising, breach of contract, product liability, fraud, professional malpractice, negligence, trespass, construction defect, antitrust and unfair competition, insurance bad faith, employment disputes and loss of earnings.

Dr. Kennedy has experience in a wide range of industries involving diverse technology.

PROFESSIONAL EXPERIENCE

2023 to present	Stout	Managing Director
2011 to 2023	Torrey Partners	Managing Director
2006 to 2011	LECG	Managing Director (2008)
1996 to 2006	Mack Barclay, Inc.	Shareholder (1998)
1995 to 1996	International Securities Group, Inc.	Director of Economic Research
1992 to 1995	Board of Governors of the Federal Reserve System, Washington, D.C.	Economist

EDUCATION

Doctorate in Economics, Stanford University, 1992

Awarded Stanford University Fellowship, Bradley Foundation Dissertation Fellowship, and Outstanding Teaching Award

Bachelor of Arts in Economics, University of California, San Diego, 1986

Muir College Valedictorian, Summa Cum Laude and Phi Beta Kappa. Awarded UC Regents Scholarship and the Seymour E. Harris Economics Award

LICENSES AND PROFESSIONAL MEMBERSHIPS

Registered Securities Representative and Registered Principal
(NASD Series 7, 24 and 63 – inactive)

American Economic Association

National Association for Business Economics

National Association for Forensic Economics

Licensing Executive Society

BOARD MEMBERSHIPS

Torrey Pines Bank, Board of Directors

University of California San Diego, Economic Leadership Board Member

SELECTED CASE AND INDUSTRY EXPERIENCE

INTELLECTUAL PROPERTY

- Patent infringement claims including cellular handset technologies, various integrated circuits, medical devices, action cameras, digital image sensors and processing, network and device security, software, social media, unmanned aerial vehicles, advertising, LED backlighting, vehicle equipment and testing, electronic lottery systems, antibacterial products, DNA-based diagnostic testing, radio frequency identification systems, apparel and other products
- Trade secret misappropriation claims including medical devices, responsive website design, drug development, network security, systems integration, merchant services, financial services, fiber-reinforced polymer systems, manufacturing, cellular handsets, Bluetooth devices and other products
- Trademark and copyright infringement claims including cloud storage, luxury watches, musical composition, a nationally branded convention, wireless headsets, food products, fashion accessories, field marketing organizations, ceiling fans, jewelry, toys, apparel, retail and other products

OTHER MATTERS

- Breach of contract, intentional interference with prospective economic advantage, professional malpractice, insurance bad faith and other claims in industries including, but not limited to, oil wells and extraction, pharmaceutical clinical trials, reference microorganisms and cell lines, aircraft rescue and firefighting vehicles, wineries, gaming and casinos, satellite television, water purification filters, defense contracting, aerospace, aircraft charter, medical services, government contracts, veterans counseling services, advertising, national franchises, printing, paper and plastics, multilevel marketing, agriculture, footwear, financial services, insurance brokerage and real estate development
- Qui Tam cases involving overbilling by major systems integrators, faulty illuminating flares used in military aviation, improper testing of semiconductors used in military applications, and faulty design of a spacecraft intended to return solar wind samples to earth
- Foodborne illness and product recall
- Natural disaster business losses, including the Northern and Southern California wildfires
- Eminent domain matters involving real estate development and construction aggregates
- Valuing liabilities associated with future product liability claims for an automobile manufacturer in bankruptcy court
- Valuing technology related to motor vehicle engine diagnostics, drone anti-collision sensor technology and other products and services
- Multidistrict product liability litigation including pharmaceutical products and asbestos
- Consumer and business class actions related to solar panels, a natural gas facility blowout, automotive products, assisted living facilities, mobile home park relocation and cellular services
- Antitrust damages in convention services, telecommunications, and aircraft
- Personal loss including aviation, maritime and under the Vaccine Injury Compensation Program

EXHIBIT B

Patrick F. Kennedy, Ph.D.
Deposition, Report, and Trial Testimony

Date	Case Name	Venue	Testimony
05/03/24	Shadow Holdings, LLC v. John Paul Mitchell Systems	American Arbitration Association	Report
05/01/24	Stiner, et al. v. Brookdale Senior Living Communities, Inc.	CA Northern - Federal Court	Report
04/17/24	Heredia, et al. v. Sunrise Senior Living, LLC	CA Central - Federal Court	Declaration
04/16/24	Pliner v. Central Iowa Health System, et al.	IA Federal Court	Deposition
04/12/24	Rex Computing, Inc. v. Cerebras Systems, Inc.	Delaware - Federal Court	Deposition
04/10/24	Saint Paul Commodities, Inc. v. Oleo-X LLC	NY American Arbitration Association	Arbitration
04/05/24	NantWorks, LLC v. Bank of America Corporation	CA Central - Federal Court	Deposition
03/19/24	NantWorks, LLC v. Bank of America Corporation	CA Central - Federal Court	Report
03/01/24	Palm Beach Tan, Inc. v. Sunless, Inc.	OH Northern - Federal Court	Deposition
02/27/24	Arm Ltd v. Qualcomm, Inc.	Delaware - Federal Court	Report
02/26/24	Rex Computing, Inc. v. Cerebras Systems, Inc.	Delaware - Federal Court	Report
02/16/24	Cocke v. United States of America, et al.	GA Southern - Federal Court	Deposition
01/30/24	NantWorks, LLC v. Bank of America Corporation	CA Central - Federal Court	Report
01/19/24	Saint Paul Commodities, Inc. v. Oleo-X LLC	NY American Arbitration Association	Deposition
01/16/24	Palm Beach Tan, Inc. v. Sunless, Inc.	OH Northern - Federal Court	Report
12/15/23	Saint Paul Commodities, Inc. v. Oleo-X LLC	AFOA - New York	Report
12/14/23	Davis v. Secretary of Department of Health and Human Services	U.S. Court of Federal Claims	Hearing
11/15/23	Eilan v. Secretary of Department of Health and Human Services	U.S. Court of Federal Claims	Hearing
10/30/23	Pacific Steel Group v. Commerical Metals Company, et al.	CA Northern - Federal Court	Report
10/19/23	Stiner, et al. v. Brookdale Senior Living	CA Northern - Federal Court	Declaration
10/16/23	Jones v. Secretary of Department of Health and Human Services	U.S. Court of Federal Claims	Hearing
10/16/23	Pliner v. Central Iowa Health System, et al.	IA Federal Court	Report
09/12/23	Pacific Steel Group v. Commerical Metals Company, et al.	CA Northern - Federal Court	Deposition
09/07/23	Bryan v. Secretary of Department of Health and Human Services	U.S. Court of Federal Claims	Hearing
09/05/23	Alorica, Inc. v. Fortinet, Inc.	Santa Clara Superior Court	Deposition
08/31/23	Alorica, Inc. v. Fortinet, Inc.	Santa Clara Superior Court	Deposition
08/22/23	Avila v. Joe Avis Farms	San Diego Superior Court	Trial
08/11/23	Alorica, Inc. v. Fortinet, Inc.	Santa Clara Superior Court	Report
08/07/23	Pacific Steel Group v. Commerical Metals Company, et al.	CA Northern - Federal Court	Report
08/02/23	Otis v. USA	CA Southern - Federal Court	Report
07/12/23	Alorica, Inc. v. Fortinet, Inc.	Santa Clara Superior Court	Report
06/30/23	Kawasaki Heavy Industries. Ltd. v. Honeywell International, Inc.	ICC Arbitration	Report
06/26/23	Bright v. Brookdale Senior Living Inc.; and Gunza v. Brookdale Senior Living Inc.	TN Middle - Federal Court	Deposition
06/01/23	Bright v. Brookdale Senior Living Inc.; and Gunza v. Brookdale Senior Living Inc.	TN Middle - Federal Court	Declaration
05/17/23	MicroVention, Inc. v. Balt USA, Inc.	CA Central - Federal Court	Deposition
04/26/23	Taction Technology, Inc. v. Apple Inc.	CA Southern - Federal Court	Deposition
04/21/23	Philips North America LLC, et al. v. TEC Holdings, Inc.	NC Western - Federal Court	Trial
04/14/23	Philips North America LLC, et al. v. TEC Holdings, Inc.	NC Western - Federal Court	Trial
04/13/23	PennyMac Loan Services, LLC v. Black Knight Servicing Technologies, LLC	FL Middle - Federal Court	Arbitration
04/03/23	William McMein Ehart, Jr., v. Lahaina Divers, Inc.	HI Federal Court	Report
03/24/23	Philips North America LLC, et al. v. TEC Holdings, Inc.	NC Western - Federal Court	Report
03/17/23	MicroVention, Inc. v. Balt USA, Inc.	CA Central - Federal Court	Report
03/10/23	Taction Technology, Inc. v. Apple Inc.	CA Southern - Federal Court	Report
03/09/23	Raymond James Financial, Inc, et al. v. Deutsche Bank AG, et al.	FINRA Dispute Resolution	Arbitration
03/02/23	Wisk Aero LLC v. Archer Aviation, Inc.	CA Northern - Federal Court	Deposition
02/22/23	Raymond James Financial, Inc, et al. v. Deutsche Bank AG, et al.	FINRA Dispute Resolution	Deposition
02/14/23	Crysel v. American Equity	Orange County Superior Court	Trial
02/10/23	Raymond James Financial, Inc, et al. v. Deutsche Bank AG, et al.	Arbitration	Report
02/08/23	Cocke v. United States of America, et al.	GA Southern - Federal Court	Report
01/26/23	Hunter v. United States of America, et al.	GA Southern - Federal Court	Report
01/24/23	Benjamin v. United States of America, et al.	CA Northern - Federal Court	Report
01/19/23	Dexcom v. Abbott	Delaware - Federal Court	Deposition
12/29/22	Crysel v. American Equity	Orange County Superior Court	Deposition
12/27/22	PennyMac Loan Services, LLC v. Black Knight Servicing Technologies, LLC	FL Middle - Federal Court	Deposition
12/21/22	Wisk Aero LLC v. Archer Aviation, Inc.	CA Northern - Federal Court	Report
12/21/22	Navarro v. United States of America, et al.	CA Southern - Federal Court	Report
12/19/22	Raymond James Financial, Inc, et al. v. Deutsche Bank AG, et al.	FINRA Dispute Resolution	Report
12/13/22	Dexcom v. Abbott	TX Western - Federal Court	Report
11/28/22	PennyMac Loan Services, LLC v. Black Knight Servicing Technologies, LLC	FL Middle - Federal Court	Report
11/22/22	Dexcom v. Abbott	TX Western - Federal Court	Report
10/25/22	PennyMac Loan Services, LLC v. Black Knight Servicing Technologies, LLC	FL Middle - Federal Court	Report
10/19/22	Avila v. Joe Avis Farms	San Joaquin Superior Court	Deposition

Patrick F. Kennedy, Ph.D.
Deposition, Report, and Trial Testimony

Date	Case Name	Venue	Testimony
09/22/22	Alcon Vision, LLC v. Lens.com, Inc.	NY Eastern - Federal Court	Deposition
08/31/22	PennyMac Loan Services, LLC v. Black Knight Servicing Technologies, LLC	CA Central - Federal Court	Report
08/17/22	Vitalyte Sports Nutrition, Inc. v. Revitalyte, LLC	TX Western - Federal Court	Deposition
08/11/22	Sunstone Information Defense, Inc. v. International Business Machines Corporation	TX Western - Federal Court	Trial
08/04/22	Rodriguez, et al. v. Sea Breeze Jet Ski, LLC	CA Northern - Federal Court	Deposition
07/28/22	Kurin, Inc. v. Magnolia Medical Technologies, Inc.	Delaware - Federal Court	Trial
07/06/22	Alcon Vision, LLC v. Lens.com, Inc.	NY Eastern - Federal Court	Report
05/18/22	Stiner, et al. v. Brookdale Senior Living Inc et al.	CA Northern - Federal Court	Declaration
05/11/22	CRF Frozen Foods v. Pictsweet, et al.	TN Middle - Federal Court	Deposition
05/04/22	Ayers v. The Penta Building Group	Riverside Cty Superior Court	Trial
03/31/22	Rodriguez, et al. v. Sea Breeze Jet Ski, LLC	CA Northern - Federal Court	Report
03/30/22	Philips North America LLC, et al. v. Little	NC Eastern - Federal Court	Report
03/25/22	The Waffle v. Tucker Investments	Los Angeles Superior Court	Trial
03/18/22	Vitalyte Sports Nutrition, Inc. v. Revitalyte, LLC	CA Southern - Federal Court	Report
03/15/22	Freitas v. Healy Tibbits Builders, Inc.	HI Federal Court	Report
03/04/22	CRF Frozen Foods v. Pictsweet, et al.	TN Middle - Federal Court	Report
02/18/22	Vitalyte Sports Nutrition, Inc. v. Revitalyte, LLC	CA Southern - Federal Court	Report
02/17/22	Sunstone Information Defense, Inc. v. International Business Machines Corporation	TX Western - Federal Court	Deposition
02/01/22	Sunstone Information Defense, Inc. v. International Business Machines Corporation	TX Western - Federal Court	Report
01/27/22	Chan v. Kimball, Tirey & St. John	San Diego Superior Court	Deposition
01/17/22	MedImpact Healthcare Systems, Inc. v. IQVIA, Inc.	CA Southern - Federal Court	Deposition
01/14/22	Nelson v. United States of America, et al.	OR - Federal Court	Trial
01/05/22	DeLeon-Piedra v. Ocean Angel V	CA Northern - Federal Court	Deposition
12/21/21	Epperson v. NYK Line, et al.	CA Northern - Federal Court	Report
12/17/21	Enventure Global Technology, Inc. v. Weatherford U.S., L.P.	TX Southern - Federal Court	Report
12/14/21	Stiner, et al. v. Brookdale Senior Living Inc et al.	CA Northern - Federal Court	Deposition
12/13/21	Sieber v. American Ship Management, LLC, et al.	CA Northern - Federal Court	Report
12/03/21	MedImpact Healthcare Systems, Inc. v. IQVIA, Inc.	CA Southern - Federal Court	Report
12/01/21	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Deposition
11/29/21	DeLeon-Piedra v. Ocean Angel V	CA Northern - Federal Court	Report
11/22/21	Nelson v. United States of America, et al.	OR Federal Court	Report
11/19/21	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Report
11/18/21	Bellin Memorial Hospital v. Kinsey & Kinsey, Inc.	WI Federal Court	Trial
11/15/21	The Waffle v. Tucker Investments	Los Angeles Superior Court	Deposition
11/05/21	Enventure Global Technology, Inc. v. Weatherford U.S., L.P.	TX Southern - Federal Court	Report
10/22/21	Benjamin v. United States of America, et al.	CA Northern - Federal Court	Report
10/21/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	San Diego Superior Court	Deposition
10/18/21	Philips North America LLC, et al. v. Dorow	NC Federal Court	Deposition
10/18/21	Philips North America LLC, et al. v. Zimmerman, et al.	NC Federal Court	Deposition
10/12/21	MicroVention, Inc. v. Balt USA, Inc.	CA Central - Federal Court	Deposition
10/08/21	In re: PFA Insurance Marketing	CA Northern - Federal Court	Declaration
09/23/21	LISCR, LLC v. Legality Holdings, S.A.	VA Eastern - Federal Court	Deposition
09/17/21	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior Court	Trial
09/08/21	Philips North America LLC, et al. v. TEC Holdings, Inc.	GA Northern - Federal Court	Deposition
09/02/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	San Diego Superior Court	Deposition
08/27/21	MicroVention, Inc. v. Balt USA, Inc.	CA Central - Federal Court	Report
08/26/21	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior Court	Trial
08/18/21	Philips North America LLC, et al. v. Zimmerman, et al.	NC Federal Court	Report
08/18/21	Stiner, et al. v. Brookdale Senior Living, et al.	CA Northern - Federal Court	Declaration
08/16/21	Philips North America LLC, et al. v. TEC Holdings, Inc.	GA Northern - Federal Court	Report
08/06/21	Kiva Health Brands, LLC v. Kiva Brands, Inc. et al.	CA Northern - Federal Court	Deposition
07/28/21	KVC Waffles Ltd. v. New Carbon Company, LLC	MD Federal Court	Report
07/22/21	Fifth Avenue Landing v. RGC FAL, LLC	San Diego Superior Court	Trial
07/16/21	In re: PFA Insurance Marketing	CA Northern - Federal Court	Deposition
07/15/21	Solid 21, Inc. v. Richemont North America, Inc., et al.	NY Southern - Federal Court	Deposition
07/09/21	Fifth Avenue Landing v. RGC FAL, LLC	San Diego Superior Court	Deposition
07/01/21	Philips North America LLC, et al. v. TEC Holdings, Inc.	GA Northern - Federal Court	Report
06/30/21	LISCR, LLC v. Legality Holdings, S.A.	VA Eastern - Federal Court	Report
06/29/21	In re: PFA Insurance Marketing Litigation	CA Northern - Federal Court	Report
06/22/21	Gillespie v. CalTrans, et al.	Riverside Superior Court	Deposition
06/09/21	Gillespie v. CalTrans, et al.	Riverside Superior Court	Deposition
06/08/21	The Chicago Trust Company v. Lakeshore Recycling Systems, LLC	IL Federal Court	Deposition

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Deposition, Report, and Trial Testimony

Date	Case Name	Venue	Testimony
06/03/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	San Diego Superior Court	Deposition
05/28/21	Kiva Health Brands, LLC v. Kiva Brands, Inc. et al.	CA Northern - Federal Court	Report
05/27/21	Solid 21, Inc. v. Richemont North America, Inc	NY Southern - Federal Court	Report
05/24/21	The Chicago Trust Company v. Lakeshore Recycling Systems, LLC	IL Federal Court	Report
05/06/21	Micheli, et al. v. The City of Fresno	Fresno Superior Court	Declaration
05/05/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	San Diego Superior Court	Report
04/30/21	Kiva Health Brands, LLC v. Kiva Brands, Inc. et al.	CA Northern - Federal Court	Report
04/23/21	Kurin Inc. v. Magnolia Medical Technologies	Delaware - Federal Court	Deposition
04/22/21	Perdue v. American Marine Corporation	Los Angeles Superior Court	Deposition
04/13/21	Newirth, et al. v. Aegis Senior Communities, LLC	CA Northern - Federal Court	Declaration
04/02/21	Lambda Labs v. Lambda, Inc.	CA Northern - Federal Court	Report
04/02/21	Philips North America LLC, et al. v. Summit Imaging Inc, et al.	WA Western - Federal Court	Deposition
03/25/21	Solid 21, Inc. v. Breitling USA Inc.	CT Federal Court	Deposition
03/18/21	Solid 21, Inc. v. Breitling USA Inc.	CT Federal Court	Report
03/18/21	Gaxiola v. United States of America, et al.	CA Southern - Federal Court	Report
03/09/21	Applied Medical Distribution Corporation v. Bruin Biometrics, LLC	Orange County Superior Court	Trial
02/18/21	Kurin Inc. v. Magnolia Medical Technologies	Delaware - Federal Court	Report
01/26/21	Philips North America LLC, et al. v. Summit Imaging Inc, et al.	WA Western - Federal Court	Report
01/20/21	Vertellus Holdings LLC, et al. v. W.R. Grace & Co-Conn	MD Federal Court	Deposition
01/15/21	Bellin Memorial Hospital v. Kinsey & Kinsey, Inc.	WI Federal Court	Deposition
11/30/20	Vertellus Holdings LLC, et al. v. W.R. Grace & Co-Conn	MD Federal Court	Report
11/13/20	Bellin Memorial Hospital v. Kinsey & Kinsey, Inc.	WI Federal Court	Report
11/04/20	Applied Medical Distribution Corporation v. Bruin Biometrics, LLC	Orange County Superior Court	Deposition
10/30/20	Underwater Kinetics v. Hanover Insurance	San Diego Superior Court	Deposition
10/29/20	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Deposition
10/09/20	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Report
09/14/20	Vertellus Holdings LLC, et al. v. W.R. Grace & Co-Conn	MD Federal Court	Report
08/14/20	Smith, et al. v. Bristol-Myers Squibb Co., et al.	FL Northern - Federal Court	Report
07/14/20	Heredia, et al. v. Sunrise Senior Living, LLC	CA Central - Federal Court	Deposition
07/06/20	Ellen J. Hutt, et al. v. Bristol-Myers Squibb Co., et al.	FL Northern - Federal Court	Report
06/30/20	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Deposition
06/23/20	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior Court	Deposition
06/16/20	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Report
05/18/20	Heredia, et al. v. Sunrise Senior Living, LLC	CA Central - Federal Court	Declaration
05/15/20	Shaw v. United States of America, et al.	CA Northern - Federal Court	Deposition
05/06/20	Brooks, et al. v. Surf N Sea, Inc, et al.	HI Federal Court	Report
04/29/20	Giles v. Emoral, Inc.	MO Western - Federal Court	Report
04/27/20	Sonner v. Nature's Way Products, LLC	CA Central - Federal Court	Report
01/24/20	Exner, et al. v. First Command Financial Services, Inc., et al.	VA Eastern - Federal Court	Report
01/13/20	Vogel, et al. v. FCA US, LLC, et al.	San Diego Superior Court	Deposition
01/10/20	Bell Northern Research, LLC v. Coolpad Technologies, Inc.	CA Southern - Federal Court	Deposition
12/27/19	Shaw v. United States of America, et al.	CA Northern - Federal Court	Report
12/11/19	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior	Deposition
12/06/19	Bell Northern Research, LLC v. Coolpad Technologies, Inc.	CA Southern - Federal Court	Report
11/21/19	Solid 21, Inc. v. Ulysse Nardin, Inc., et al.	FL Southern - Federal Court	Deposition
10/21/19	Newirth, et al. v. Aegis Senior Communities, LLC	CA Northern - Federal Court	Declaration
10/10/19	Micheli v. The City of Fresno	Fresno Superior Court	Deposition
10/09/19	Kurin Inc. v. Magnolia Medical Technologies	CA Southern - Federal Court	Deposition
10/07/19	Solid 21, Inc. v. Ulysse Nardin, Inc., et al.	FL Southern - Federal Court	Report
09/27/19	DK Holdings dba DotCom Host v. Miva, Inc., et al.	CA Southern - Federal Court	Report
09/24/19	Cordero v. Tadashi Shoji & Associates Inc.	Los Angeles Superior Court	Deposition
09/11/19	Taylor v. Norfolk Railway	IL State Court	Trial
09/03/19	Horner v. Leone, et al.	San Diego Superior Court	Deposition
08/30/19	Kurin Inc. v. Magnolia Medical Technologies	CA Southern - Federal Court	Report
08/27/19	Micheli, et al. v. The City of Fresno	Fresno Superior	Deposition
07/08/19	Reynolds v. Western Sugar Cooperative	NEB - Federal Court	Deposition
06/27/19	Credit Card Services, Inc. v. Chuang, et al.	Los Angeles Superior Court	Trial
06/24/19	Micheli, et al. v. The City of Fresno	Fresno Superior Court	Declaration
06/14/19	Ironhawk Technologies, Inc. v. Dropbox	CA Central - Federal Court	Deposition
05/31/19	Ironhawk Technologies, Inc. v. Dropbox	CA Central - Federal Court	Report
05/29/19	Taylor v. Norfolk Railway	IL State Court	Report
05/24/19	Rosen v. Kaiser Foundation Health Plan, et al.	Arbitration	Trial

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Date	Case Name	Venue	Testimony
05/20/19	Kashani, et al. v. Mercury Casualty Company	Los Angeles Superior Court	Report
05/16/19	Taylor v. Norfolk Railway	IL State Court	Report
05/06/19	Ceralde v. Tote Services, Inc., et al.	CA Northern - Federal Court	Report
05/01/19	Escobar v. Airbus Group, S.E., et al.	HI Federal Court	Report

EXHIBIT C

Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc. v. Arm Ltd.
Documents Considered List

Exhibit C

Date	Description
<i>*In addition to the materials listed below, the materials I considered also include all cited sources in my expert report, and my opening expert report dated February 27, 2024.</i>	
Legal	
09/30/22	Qualcomm's Answer and Defenses to Arm's Complaint and Jury Demand and Qualcomm's Amended Counterclaim, <i>Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.</i> , Civil Action No. 1:22-cv-01146-MN
11/15/22	Arm Ltd.'s Answer and Affirmative Defenses to Qualcomm's Amended Counterclaim
03/13/24	Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Second Amended Counterclaims
04/12/24	Arm Ltd.'s Objections and Responses to Qualcomm's Sixth Set of Requests for Production (Nos. 125-147)
04/29/24	Arm Ltd.'s Objections and Responses to Qualcomm's Fifth Set of Interrogatories
05/03/24	Arm Ltd.'s Responses and Objections to Qualcomm's Seventh Set of Requests for Production (Nos. 148-154)
05/07/24	Defendants' Responses and Objections to Plaintiff's Third Set of Interrogatories (Nos. 26-29)
05/10/24	Arm Ltd.'s Objections and Responses to Qualcomm's Sixth Set of Interrogatories (No. 29)
05/10/24	Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Fifth Set of Interrogatories (Nos. 26-28)
Depositions	
11/15/23	Deposition of Cristiano Amon and Exhibits CEO of Qualcomm, Inc.
10/25/23	Deposition of Tim Herbert and Exhibits Former Vice President of North American Sales at Arm Ltd.
12/07/23	Deposition of Mark Werkheiser and Exhibits Distinguished Engineer at Arm Ltd.
05/10/24	Rule 30(b)(6) Deposition of Guy Larri Distinguished Engineer at Arm Ltd.
Expert Reports	
02/27/24	Expert Report of Patrick F. Kennedy, Ph.D.
05/20/24	Opening Expert Report of Dr. Murali Annavaram Regarding Qualcomm's Counterclaim
Produced Documents	
<i>*If the bates number referenced below is the beginning of a document/production, the bates reference is to the entire document.</i>	
<i>*I had access to a document repository containing documents produced by Arm, Qualcomm, and other 3rd parties.</i>	
ARM_00002166	ARM_01302909 QCARM_0315570 QCARM_3616504
ARM_00003621	ARM_01305265 QCARM_0337839 QCARM_3626049
ARM_00037458	ARM_01305375 QCARM_0337857 QCARM_3674878
ARM_00037462	ARM_01315342 QCARM_0338277 QCARM_3682258
ARM_00043894	ARM_01425194 QCARM_0338297 QCARM_3819781
ARM_00049072	ARM_01435422 QCARM_0338573 QCARM_3819785
ARM_00049139	ARM_01435455 QCARM_0338983 QCARM_3819786
ARM_00051378	ARM_01435466 QCARM_0339100 QCARM_3839281
ARM_00057152	ARM_01436707 QCARM_0339326 QCARM_3839896
ARM_00057594	ARM_01436796 QCARM_0341136 QCARM_3859365
ARM_00059363	ARM_01436919 QCARM_0342825 QCARM_3862422
ARM_00082871	ARM_01437116 QCARM_0343120 QCARM_3862424
ARM_00082874	ARM_01437128 QCARM_0343143 QCARM_3880649
ARM_00093852	ARM_01437135 QCARM_0343533 QCARM_3912283
ARM_00097512	ARM_01437178 QCARM_0343649 QCARM_3919919
ARM_00097522	ARM_01437214 QCARM_0343954 QCARM_6920658
ARM_00114880	ARM_01437222 QCARM_0350826 QCARM_7389922
ARM_00116328	ARM_01465116 QCARM_0351402 QCARM_7389941
ARM_00118835	ARM_01450767 QCARM_0352878 QCARM_7427707
ARM_01226492	ARM_01460538 QCARM_0356834 QCARM_7471719
ARM_01226504	ARM_01462242 QCARM_0569125 QCARM_7497374
ARM_01232495	ARM_01462325 QCARM_2422682 QCARM_7627803
ARM_01237494	ARM_SC_1_00001346 QCARM_2429058 QCARM_7629881
ARM_01240354	QCARM_0340961 QCARM_3318368 QCARM_7634056
ARM_01240449	QCARM_0020009 QCARM_0332490 QCARM_7635065
ARM_01246086	QCARM_0275743 QCARM_3429791 QCARM_7646660
ARM_01291148	QCARM_0276221 QCARM_3474751
ARM_01291691	QCARM_0276430 QCARM_3485462
ARM_01302854	QCARM_0276431 QCARM_3485446
Research	
Arm Neoverse CMN-650 Coherent Mesh Network Technical Reference Manual, Revision r2p0	
Arm Corelink NI-700 Network-on-Chip Interconnect Technical Reference Manual, Revision r2p0	
Arm Holdings PLC Amendment No. 2 to Form F-1, September 5, 2023	
Arm Neoverse CMN-700 Coherent Mesh Network Technical Reference Manual, Revision r3p2	
https://armkeil.blob.core.windows.net/developer/Files/pdf/solution_overview-corelink-cmn-700.pdf	
https://community.arm.com/arm-community-blogs/b/architectures-and-processors-blog/posts/new-arm-interconnect	
https://community.arm.com/arm-community-blogs/b/architectures-and-processors-blog/posts/system-validation-at-arm-enabling-our-partners-to-build-better-systems	
https://community.arm.com/arm-community-blogs/b/infrastructure-solutions-blog/posts/arm-neoverse-s3-enables-chiplets-and-leading-memory-and-io	
https://developer.arm.com/documentation/100310/0100/introduction/about-the-mmu-600	
https://developer.arm.com/documentation/101481/0200/?lang=en	
https://developer.arm.com/Processors/CoreLink%20MMU-700#Technical-Specifications	
https://developer.arm.com/Processors/Neoverse%20CMN%20S3	
https://newsroom.arm.com/news/arm-system-ip-boosts-soc-performance-from-edge-to-cloud	
https://newsroom.arm.com/news/transforming-compute-for-next-generation-infrastructure	
https://web.archive.org/web/20220522200303/	
https://www.allaboutcircuits.com/news/why-socs-need-nocs-network-on-chip-and-future-computing/	
https://www.arm.com/products/silicon-ip-system/corelink-interconnect/cmn-700	
https://www.arm.com/products/silicon-ip-system/neoverse-interconnect/cmn-s3	

Exhibit 14

MURALI ANNAVARAM Highly Confidential
ARM, LTD. vs QUALCOMM INC.

June 27, 2024

1

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ARM, LTD., a U.K. corporation,)
) C.A. No.
Plaintiff,) 22-1146-MN
)
VS.)
)
QUALCOMM INC., a Delaware)
corporation, QUALCOMM)
TECHNOLOGIES, INC., a Delaware)
corporation, and NUVIA, INC., a)
Delaware corporation,)
)
Defendants.)
_____)

(Pursuant to Protective Order,
this Transcript is Deemed Highly Confidential)

Videotaped Deposition of Murali Annavaram

Los Angeles, California

Thursday, June 27, 2024

REPORTED BY:
KIMBERLY WILDISH
CSR NO.: 8078
JOB NO: J11410864

MURALI ANNAVARAM Highly Confidential
ARM, LTD. vs QUALCOMM INC.

June 27, 2024

3

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Jacob Braly, Esq.
Jbraly@paulweiss

ALSO PRESENT:

Vincent Mazza, Videographer
Esquire Deposition Solutions

I N D E X

WITNESS:	EXAMINATION	PAGE
Murali Annavaram	Mr. Muino	8
		148
	Ms. Nyarady	248

E X H I B I T S

Deposition Exhibits

Exhibit 1	- Opening Expert Report of Dr. Murali Annavaram	17
Exhibit 2	- Rebuttal Expert Report of Dr. Murali Annavaram January 27, 2024 (RETAINED BY COUNSEL)	60
Exhibit 3	- [REDACTED]	
	QCARM_0490031 - 0490328	
Exhibit 4	- ANNEX 1 NUVIA ARMV8-A ARCHITECTURE ARM_00002654 - 00002667	180
Exhibit 5	- 27 September 2019 NuVia Definitions QCARM_0337839 - 0337855	188
Exhibit 6	- [REDACTED]	
	QCARM_3005305 - 3005308	

MURALI ANNAVARAM Highly Confidential
ARM, LTD. vs QUALCOMM INC.

June 27, 2024

8

1 MURALI ANNAVARAM,
2 HAVING BEEN FIRST DULY SWORN, WAS
3 EXAMINED AND TESTIFIED AS FOLLOWS:
4

09:06:34

5 EXAMINATION
6

09:06:34

7 MR. MUINO: Good morning, Dr. Annavaram.

8 THE WITNESS: Good morning.

9 BY MR. MUINO:

10 Q. Can you please state your name, for the
11 record.

09:06:53

12 A. My name is Murali Annavaram.

13 Q. Have you had your deposition taken
14 before?

15 A. I...

09:07:02

16 Yes. A few times.

17 Q. How many times have you been deposed?

18 A. Maybe somewhere between six to ten times.

19 Q. And were all of those depositions in a
20 capacity as an expert witness in litigation?

09:07:16

21 A. Yeah. Different kinds of litigations,
22 but expert witness in all those I testified, yes.

23 Q. Have you had your deposition ever taken
24 in another type of case, where you weren't testifying as
25 an expert witness?

09:07:32

1 A. Yeah. I brought with me a set of files.

2 MS. NYARADY: Hold on one second.

3 Can I get an exhibit sticker.

4 (THE DOCUMENT REFERRED TO AS

5 EXHIBIT 11 WAS MARKED AND WAS

6 RETAINED BY COUNSEL)

7 MS. NYARADY: So just for completeness, so that
8 we have a record of what you brought with you, I've
9 marked as Exhibit 11 the source code that you brought to
10 the deposition.

11 Q. And I just want to ask you: What does
12 the source code relate to?

13 A. So it relates to various things that I
14 have already discussed during my deposition til now.

15 For example, [REDACTED]
[REDACTED]
[REDACTED]

18 I have provided some examples already in
19 my report. And in fact, I cited to some of those files
20 as well.

21 So I just thought maybe I'd bring
22 additional examples for the deposition, if it will
23 clarify additional things that we discussed at length
24 today.

25 MR. MUINO: And, Counsel, I'm just going to

MURALI ANNAVARAM Highly Confidential
ARM, LTD. vs QUALCOMM INC.

June 27, 2024
253

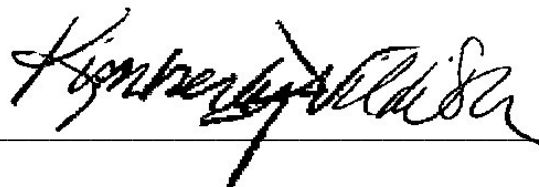
Reporter's Certificate
of
Certified Shorthand Reporter

* * * * *

I, the undersigned Certified Shorthand Reporter, in
and for the State of California, do hereby certify:
That the foregoing proceedings were taken before me
at the time and place therein set forth, at which time
the witness was put under oath by me; that the testimony
of the witness and all objections at the time of the
proceedings were recorded stenographically by me and
were thereafter transcribed under my direction; that
the foregoing is a true record of the testimony and
of all objections made at the time of the proceedings.

In witness whereof, I have subscribed my name on:

DATE: June 30th, 2024



KIMBERLY WILDISH, CSR NO. 8078

Exhibit 15

1 IN THE UNITED STATES DISTRICT COURT

2 FOR THE DISTRICT OF DELAWARE

3 ARM LTD.,)

4 PLAINTIFF,)

5 VS.)

Case No. 22-1146 (MN)

6 QUALCOMM INC., QUALCOMM)
7 TECHNOLOGIES, INC., and)
8 NUVIA, INC.,)

9 DEFENDANTS.)
_____)

10
11
12 VIDEOTAPED DEPOSITION OF DR. ROBERT COLWELL

13 TRANSCRIPT DESIGNATED HIGHLY CONFIDENTIAL

14 FRIDAY, JUNE 28, 2024, 9:07 A.M.

15 LOS ANGELES, CALIFORNIA
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19
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22

23 Reported by Desiree Cooks, CSR No. 14075

24 Job No. 6768619

25 Pages 1 - 271

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(NONE)

DOCUMENTS REQUESTED

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(NONE)

WITNESS INSTRUCTED NOT TO ANSWER

PAGE	LINE
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57	23
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1 Will our court reporter please swear in the
2 witness.

3 DR. ROBERT COLWELL,
4 having been first duly sworn, testifies as follows:

09:08:02 5 EXAMINATION

6 BY MS. NYARADY:

7 Q Good morning, Dr. Colwell.

8 A Good morning.

9 Q You are appearing today and in this case as an
09:08:11 10 expert witness; right?

11 A Yes.

12 Q What is your area of expertise with respect to
13 this case?

14 A Generally, computer design, including computer
09:08:20 15 architecture, microarchitecture, systems, software. The
16 list is pretty long.

17 Q Is the list included in those general
18 categories, or are there other things that you are
19 claiming -- or relying on your expertise for this case?

09:08:38 20 A Well, the thing -- I didn't say hardware. I'm
21 primarily a hardware designer.

22 But I don't think -- that doesn't seem to be
23 heavily related to the case, so I didn't put it on the
24 list, but that's another area that I'm an expert at.

09:08:57 25 Q You're not a lawyer, are you?

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10:45:27 5

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10:45:49 10

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10:46:08 15

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10:46:25 20

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10:46:52 25

[REDACTED]
[REDACTED]. And we -- I believe I called attention
to that [REDACTED] in some of my reports as being an example of

[REDACTED]
[REDACTED].
So what I mean is even though -- so okay. To
the extent that that is what's happening and if what

[REDACTED]
[REDACTED]
[REDACTED], then it could
be, it seemed to me, that his conclusion that [REDACTED]

[REDACTED]
[REDACTED], then
that wouldn't be as good of an example as I was making it
out to be.

So that -- that's where I'm coming from. It
doesn't change my basic opinion, however, because [REDACTED]

[REDACTED]
[REDACTED] It's just that I

believe I drew attention specifically to [REDACTED]
because it was the easiest place to see [REDACTED]

[REDACTED].
Q You also drew attention to [REDACTED]

[REDACTED]; right?

HIGHLY CONFIDENTIAL UNDER THE PROTECTIVE ORDER

Page 271

REPORTER'S CERTIFICATION

I, Desiree Cooks, Certified Shorthand Reporter in
and for the State of California, do hereby certify:

That the foregoing witness was by me duly sworn;
that the deposition was then taken before me at the time
and place herein set forth; that the testimony and
proceedings were reported stenographically by me and
later transcribed into typewriting under my direction;
that the foregoing is a true record of the testimony and
proceedings taken at that time.

Further, that if the foregoing pertains to the
original transcript of a deposition in a federal case,
before completion of the proceedings, review of the
transcript [] was [] was not requested.

IN WITNESS WHEREOF, I have subscribed my name on
this date: July 3, 2024



Desiree Cooks, CSR No. 14075

Exhibit 16

HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ARM LTD., a U.K. corporation,	§	
	§	
Plaintiff,	§	
	§	
v.	§	C.A. No. 22-1146 (MN))
	§	
QUALCOMM, INC., a Delaware	§	
corporation, QUALCOMM	§	
TECHNOLOGIES, INC., a Delaware	§	
corporation, and NUVIA, INC., a Delaware	§	
corporation	§	
	§	
Defendants.	§	

REPLY EXPERT REPORT OF W. TODD SCHOETTELKOTTE
RELATING TO REMEDIES FOR COUNTERCLAIM-PLAINTIFFS’ CLAIMS

I DECLARE UNDER PENALTY OF PERJURY THAT THE FOLLOWING IS TRUE AND CORRECT.


W. TODD SCHOETTELKOTTE

6-10-24
EXECUTED ON

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I. INTRODUCTION

1. Plaintiff Arm Ltd. (“Arm” or “Plaintiff”) has accused Defendants Qualcomm Inc., Qualcomm Technologies, Inc. (collectively, “Qualcomm”) and Nuvia, Inc. (“Nuvia”) (both collectively, “Defendants”) of breaching the Nuvia Architecture License Agreement (the “Nuvia ALA”).¹ The details of this initial dispute are detailed in my opening expert report, dated December 20, 2023 (“Initial Report”), and my reply expert report, dated March 25, 2024 (“Reply Report”), submitted during the course of expert discovery in this litigation.

2. After submission of my Initial Report, Qualcomm and Nuvia accused Arm of (a) breaching the Nuvia ALA by “fail[ing] to fulfill its termination obligations to NUVIA, as set forth in [REDACTED] of the NUVIA ALA, [REDACTED] [REDACTED]” and (b) breaching the Nuvia TLA by “fail[ing] to fulfill its termination obligations to NUVIA, as set forth in [REDACTED] [REDACTED] [REDACTED]” (collectively, the “Counterclaims”).²

3. On May 20, 2024, Patrick F. Kennedy, Ph.D. issued an expert report (“Kennedy Counterclaim Report”) which includes his opinions as to the alleged damages associated with Nuvia’s and Qualcomm’s Counterclaims. I have been retained as an expert on behalf of Arm to evaluate and respond to the Kennedy Counterclaim Report. I was asked to assume for purposes of my report that that Arm is found liable for breach of the Nuvia ALA and Nuvia TLA, but I offer no opinion regarding liability.

¹ Complaint, August 31, 2022, pp. 16 – 18.

² Defendants’ Answer and Defenses to Plaintiff’s Complaint and Jury Demand and Defendants’ Second Amended Counterclaims, March 13, 2024, pp. 84 – 85.

4. My analysis, as set forth in this report, is based on information available to me as of the date of this report.

II. CREDENTIALS AND COMPENSATION

5. I am a Senior Managing Director of J.S. Held LLC (“J.S. Held”), a global consulting firm providing specialized technical, scientific, financial, and advisory services.³ I currently serve as the firm’s Intellectual Property Practice Lead. My credentials were detailed in my Initial Report. Attached as Schedule 1 to this report is a summary of my professional background and testifying experience, including all publications over the last ten years and all expert testimonies over the last four years.

6. J.S. Held is compensated for my team’s involvement in this matter based upon J.S. Held’s hourly billing rates. My time is currently billed at a rate of \$695 per hour. J.S. Held’s fee is not contingent upon the outcome of this litigation or the opinions that I express.

III. INFORMATION REVIEWED AND CONSIDERED

7. In connection with the preparation of this report, I have reviewed and considered the information included in my Initial Report and Reply Report, as well as additional documents and data produced by the parties; legal documents (and related exhibits); deposition testimony (and related exhibits); and publicly available information, articles, press releases, and Internet websites. The additional documents and other information that I have reviewed and considered as of the date of this report include those cited throughout this report (including the footnotes) as well as those listed on Schedule 2 attached to this report. I have also held discussions with Arm personnel, including those listed in my Initial and Reply Reports, as well as Jeff Defilippi (Senior

³ J.S. Held and its affiliates and subsidiaries are not a certified public accounting firm and do not provide audit, attest, or any other public accounting services. J.S. Held is not a law firm and does not provide legal advice.

Director of Product Management of Infrastructure Line of Business at Arm), Mark Werkheiser (Fellow at Arm), and Ying Yau (Senior Director of Licensing at Arm). I have also had discussions with Arm's technical expert, Robert Colwell, Ph.D. In addition, I have reviewed and considered the following 30(b)(6) deposition transcripts (and related exhibits), in addition to the deposition transcripts and exhibits referenced in my Initial and Reply Reports:

Arm

- Guy Larri, Distinguished Engineer

Nuvia

- Geetha Vedaraman, SOC Architect

8. In addition to the above, I have also reviewed and considered the Kennedy Counterclaim Report, including the opinions, documents, and other information cited therein. In forming my opinions in this case, I have relied upon the information and documents identified in my Initial Report, Reply Report, and this report, and I have also relied upon my more than 25 years of experience and expertise in analyzing remedies for misuse of intellectual property, analyzing the adequacy of damages to compensate for harms relating to the misuse of intellectual property, and assessing and calculating damages adequate to compensate for such harms. My analysis in this case is ongoing. Should additional information, such as documents or data provided by the parties, testimony, whether through expert report or deposition, or rulings issued by the Court, come to my attention after the date of this report, I may find it necessary to update or revise my analysis, opinions, and conclusions. I reserve my right to do so.

IV. LEGAL FRAMEWORK FOR DAMAGES

9. I am informed and understand that a party who proves liability for breach of a contract is entitled to damages adequate to compensate for the reasonable and foreseeable harm

suffered by the party. I am informed and understand that the measure of damages must be non-speculative and ascertainable with reasonable certainty but need not be exact.

10. I am informed and understand that, while generally not available as a remedy for breach of contract, a party can seek disgorgement of profits as an equitable remedy for breach of contract under a theory of quasi-contract. I am informed and understand that disgorgement of profits is only available where there is no adequate remedy at law to redress the party's injury. I am informed and understand that a party seeking disgorgement of profits based on breach of contract must show that the breaching party was unjustly enriched. I am informed and understand that a party is unjustly enriched when they receive a benefit and unjustly retain the benefit at the expense of another.

V. SUMMARY OF OPINIONS

11. In my opinion, Dr. Kennedy's opinions rely on flawed assumptions and a flawed methodology to calculate alleged damages associated with Arm's incorporation and use of what Dr. Kennedy refers to as the "At-Issue CMN Features."

12. First, Dr. Kennedy's opinions are deficient because he relies on several flawed assumptions, including:

- Dr. Kennedy wrongly assumes that licensees have paid licensing fees and/or royalties to Arm because of the presence of any one or more of the At-Issue CMN Features in ARM CMN products. Dr. Kennedy does not cite any evidence that supports that assumption, and I am aware of none.
- Dr. Kennedy wrongly assumes that Arm would invest in the redevelopment or reimplement of one or more of the At-Issue CMN Features if Arm were forced to remove them from any Arm CMN product after termination of the Nuvia ALA and TLA. Dr. Kennedy does not cite any evidence that supports that assumption, and I am aware of none.
- Dr. Kennedy wrongly assumes that Nuvia and Qualcomm have been harmed by any alleged benefits Arm has received from the At-Issue

CMN Features. Dr. Kennedy does not cite any evidence that supports that assumption, and I am aware of none.

13. Second, Dr. Kennedy's purported methodology and damages are flawed for several additional reasons. Dr. Kennedy does not calculate, in whole or in part, any specific alleged damages and his alleged methodology is also flawed for many reasons, including the following:

- Dr. Kennedy purports to identify relevant licensees, but simultaneously claims that he is lacking information about the relevant licensees.
- Dr. Kennedy claims to have insufficient information to identify relevant Arm licensees' fees and royalties, while simultaneously identifying documents with this information.
- Dr. Kennedy claims to have insufficient information to attribute value to new features in CMN-Kampos but fails to consider available documents which do provide insight regarding the value of new CMN features and reason for any potential price premium.
- Dr. Kennedy fails to perform or present a technical apportionment analysis, instead deferring to a lack of documents from Arm, despite his assertion that the At-Issue CMN features were driven by Nuvia's demand and feature requests.
- Dr. Kennedy contends that Arm's benefit would be "limited to the time period when Arm would independently develop that At-Issue CMN Features" but fails to identify that time period or explain why he has not identified that time period.

VI. BACKGROUND

14. A discussion of the industry at issue, parties at issue, and the Nuvia TLA and ALA was included in Section VI of my Initial Report and is incorporated herein.

A. Coherent Mesh Network

15. I understand the technology at issue in this matter is referred to as a Coherent Mesh Network ("CMN"). A CMN is an on-chip interconnect IP product that is designed to allow various components of a System-on-a-Chip ("SoC") (*i.e.*, CPUs, GPUs, accelerators, etc.) to

interact with each other and on-chip memory.⁴

16. Arm's website describes the CMN-700 as follows: "[t]he Arm Neoverse CMN-700 Coherent Mesh Network is designed for intelligent connected systems across a wide range of applications, including networking infrastructure, storage, server, HPC, automotive, and industrial solutions. The highly scalable mesh is optimized for Armv9 and Armv8-A processors, multichip configurations, and CXL attached devices. It can be customized across a wide range of performance points."⁵ Further, Arm's CMN-700 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]"⁶

17. Prior to the release of CMN-700 (also known as CMN-Kampos), Arm had previous versions referred to as CMN-600 (CMN-Porter) and (CMN-650) (CMN-Rhodes).⁷ CMN-600 was the first CMN product which Arm offered.⁸ Over the years, improvements to CMN have occurred, and been implemented in various versions, including CMN-600, CMN-600AE, CMN-650, and CMN-700.⁹

B. Nuvia TLA and Nuvia ALA

18. As discussed in my Initial Report, Arm and Nuvia executed the Nuvia TLA in September 2019.¹⁰ Arm and Nuvia also executed [REDACTED] to the Nuvia TLA effective March 27, 2020.¹¹ As part of [REDACTED] Arm granted to Nuvia a non-exclusive, world-wide license to the

⁴ Discussions with Jeff Defilippi and Mark Werkheiser; Deposition of Mark Werkheiser, December 7, 2023, p. 11.

⁵ <https://www.arm.com/products/silicon-ip-system/corelink-interconnect/cmn-700>.

⁶ Arm Neoverse CMN-700 Coherent Mesh Network, Technical Reference Manual, Revision: r3p2, p. 17.

⁷ Colwell Rebuttal Report, pp. 11 – 15.

⁸ Colwell Rebuttal Report, p. 12.

⁹ Colwell Rebuttal Report, pp. 11 – 15.

¹⁰ ARM_00111064 – 080.

¹¹ ARM_01436707 – 716.

[REDACTED]

[REDACTED] Further, [REDACTED] provided an [REDACTED]

[REDACTED]

[REDACTED]¹³ Nuvia agreed to a license fee of [REDACTED] for the rights granted in

[REDACTED].¹⁴ [REDACTED] also included [REDACTED] as follows:

[REDACTED]

[REDACTED] defined "[REDACTED]" to include [REDACTED]

[REDACTED]

[REDACTED]¹⁶ [REDACTED] also stated that [REDACTED]

[REDACTED]¹⁷ [REDACTED] also stated that [REDACTED]

[REDACTED]¹⁸

19. Arm and Nuvia executed [REDACTED] to [REDACTED] of the Nuvia TLA effective January 18, 2021.¹⁹ The [REDACTED] stated that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

were identified in [REDACTED] to the Nuvia TLA.²¹

20. In addition to the Nuvia TLA, the parties executed the Nuvia ALA in September 2019.²² The Nuvia ALA also indicated that [REDACTED]

[REDACTED] identified in [REDACTED] of the Nuvia ALA.²³ [REDACTED] was defined as [REDACTED]

[REDACTED]

[REDACTED]²⁴

21. As such, I understand that Arm asserts that “[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]²⁵

C. [REDACTED] to Qualcomm TLA

22. Qualcomm and Arm first entered into a TLA in 1997.²⁶ Effective July 23, 2021, Arm and Qualcomm executed [REDACTED] the Qualcomm TLA.²⁷ [REDACTED] included rights to Arm

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²⁵ Arm Ltd.’s First Supplemental Objections and Responses to Qualcomm’s Fifth Set of Interrogatories (Nos. 26-28), May 10, 2024, p. 21.

[REDACTED]

[REDACTED]

products, including Neoverse CMN-700-Max Coherent Mesh Network.²⁸ Qualcomm agreed to pay a [REDACTED] for all the products included in [REDACTED].²⁹ The royalty payment was stated to be payable [REDACTED]

[REDACTED] Specifically, the [REDACTED] containing a Neoverse CMN-700-Max Coherent Mesh Network.³¹

D. CMN Features at Issue

23. Dr. Kennedy contends that the alleged damages relate to Arm's incorporation of the following "At-Issue CMN Features" into Arm's CMN products: [REDACTED]

[REDACTED] These features were identified by Arm as those that "were requested by Nuvia and implemented by Arm."³³ The At-Issue CMN Features are also the only features addressed in the Opening Expert Report of Dr. Murali Annavaram Regarding Qualcomm's Counterclaim dated May 20, 2024 ("Annaram Report"). Accordingly, I will focus on the At-Issue CMN Features in this report.

24. I understand from discussions with Mr. Werkheiser that he is not aware of any Arm partners, aside from Qualcomm/Nuvia, using (or in the past having used) certain of the At-Issue CMN Features, suggesting that those features had value only to Nuvia. In particular, I understand from discussions with Mr. Werkheiser that he is not aware of any Arm partners, aside

²⁸ QCARM_3485446 - 461 at 446 - 447.

²⁹ QCARM_3485446 - 461 at 459.

³⁰ QCARM_3485446 - 461 at 460.

³¹ QCARM_3429791 - 872 at 819.

³² Kennedy Counterclaim Report, p. 21.

³³ Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Fifth Set of Interrogatories (Nos. 26-28), May 10, 2024, p. 18.

from Qualcomm/Nuvia, using [REDACTED]

25. Additionally, I understand from discussions with Mr. Werkheiser that certain of the At-Issue CMN Features were requested by other Arm partners before they were requested by Nuvia, suggesting that those features were not necessarily attributable to Nuvia, but that they were not implemented in response to those requests. In particular, I understand from discussions with Mr. Werkheiser that other partners requested [REDACTED] before those features were requested by Nuvia, but that those features were not implemented in response to those requests. I understand from discussions with Mr. Werkheiser that Arm's decision to not implement these features did not impact partners' acceptance of prior versions of CMN, suggesting a limited value (if any) for those features.³⁵

26. Although Dr. Kennedy focuses on only the At-Issue CMN Features, he also states that "[i]n or around August 2020, Counterclaim-Plaintiffs assert that Arm agreed to include over 25 enhancements to CMN-Kampos that were not featured in CMN-Rhodes. In another spreadsheet, there are 17 features requested that were assessed validated, pushed to RTL, and supported by Arm."³⁶ However, Mr. Werkheiser testified that Arm did not implement all the features requested by Nuvia.³⁷ Mr. Werkheiser further testified that "about half of these I don't think we ended up implementing, if we are talking about this table [REDACTED]. So that—that by definition, means not a majority. And then there's a portion of these even that were implemented that weren't really—they were part of the CMN feature set exist—you know, before Nuvia made

³⁴ Discussions with Mark Werkheiser.

³⁵ Discussions with Mark Werkheiser.

³⁶ Kennedy Counterclaim Report, pp. 19 – 20.

³⁷ Deposition of Mark Werkheiser, December 7, 2023, pp. 52 – 53.

the request.”³⁸ Additionally, Mr. Werkheiser stated that “some [features] were already part of our kind of plan—a bunch of these were already part of our plan for CMN products.”³⁹ I understand from Mr. Werkheiser that the number of features requested by Nuvia did not exceed the typical number of feature requests made by Arm’s lead partners.⁴⁰

VII. ASSESSMENT OF THE KENNEDY COUNTERCLAIM REPORT

A. Summary

27. In his report, Dr. Kennedy states that “this report provides [his] affirmative opinions of the damages resulting from Counterclaim-Defendant’s alleged harmful acts, which are set forth in Counterclaim-Plaintiff’s second amended counterclaims.”⁴¹ However, Dr. Kennedy provides no quantification of damages in his report. Specifically, Dr. Kennedy asserts that he described his methodology in his report “but do[es] not provide a numerical figure” since “sufficient information has not been produced....”⁴²

28. The Kennedy Counterclaim Report states that:

In the but-for world, Arm would have had to develop the At-Issue CMN Features following the termination, and the features would not have been available to license until the At-Issue CMN Features were independently developed by Arm. However, Arm allegedly received license fees and royalties for CMN-Kampos which are attributable, at least in part, to the Nuvia Confidential Information during the post-termination period. The license fees and royalties attributable to the At-Issue CMN features during the period from termination up until Arm would have completed development, represent benefits Arm would not have otherwise received without the alleged breach.⁴³

29. Although Dr. Kennedy does not calculate damages, he does outline the following methodology that he would purportedly use to quantify alleged damages:

³⁸ Deposition of Mark Werkheiser, December 7, 2023, pp. 51, 55.

³⁹ Deposition of Mark Werkheiser, December 7, 2023, p. 54.

⁴⁰ Discussions with Mark Werkheiser.

⁴¹ Kennedy Counterclaim Report, p. 1.

⁴² Kennedy Counterclaim Report, p. 27.

⁴³ Kennedy Counterclaim Report, p. 22.

- “Identification of Relevant Arm Licensees;”⁴⁴
- “Identification of Relevant Arm Licensees’ Fees and Royalties;”⁴⁵
- “Attributing Value to New Features in CMN-Kampos;”⁴⁶
- “Relative Value of the At-Issue CMN Features to New Features;”⁴⁷ and
- “Limiting Fees to the Relevant Time Period.”⁴⁸

30. I have reviewed and considered the Kennedy Counterclaim Report as well as documents and information referenced by Dr. Kennedy. As described further below, Dr. Kennedy’s assumptions and methodology are fundamentally flawed. Throughout the remainder of this report, I provide my assessment of the discussion and conclusions set forth in the Kennedy Counterclaim Report. Overall, Dr. Kennedy fails to distinguish between damages to Qualcomm or Nuvia and any benefit received by Arm. Any lack of specific criticism is not meant to imply and is not agreement with Dr. Kennedy’s opinions and conclusions.

B. Kennedy’s Damages Framework Is Based on Flawed Assumptions

31. Dr. Kennedy begins his “Damages Analysis”⁴⁹ with a discussion of his “Damages Framework.”⁵⁰ As discussed in more detail below, Dr. Kennedy’s “Damages Framework” suffers from three fundamental flaws: (1) Dr. Kennedy provides no evidence that any licensee paid any licensing fees or royalties to Arm based on the presence of any one or more At-Issue CMN Features in any Arm CMN products (and I am aware of none); (2) Dr. Kennedy provides no evidence that Arm would invest in redeveloping or reimplementing any one or more of the At-Issue CMN Features if Arm were required to remove them from any Arm CMN product (and I

⁴⁴ Kennedy Counterclaim Report, pp. 24 – 25.

⁴⁵ Kennedy Counterclaim Report, pp. 25 – 26.

⁴⁶ Kennedy Counterclaim Report, p. 26.

⁴⁷ Kennedy Counterclaim Report, pp. 26 – 27.

⁴⁸ Kennedy Counterclaim Report, p. 27.

⁴⁹ Kennedy Counterclaim Report, p. 21.

⁵⁰ Kennedy Counterclaim Report, pp. 21 – 22.

am aware of none); and (3) Dr. Kennedy purports to address the benefit to Arm but does not identify any damages or harm caused to Nuvia or Qualcomm, does not quantify any damages or harm to Nuvia or Qualcomm, and does not disclose any methodology for calculating any damages or harm to Nuvia or Qualcomm.

i. There is no evidence that licensing fees and royalties Arm received for its CMN products are in any way related to the inclusion of the At-Issue CMN Features

32. Dr. Kennedy's "Damages Framework" begins by stating that "Counterclaim-Plaintiffs assert that Arm benefits from use of the Nuvia Confidential Information by generating licensing fees and royalties by licensing Nuvia Confidential Information under various agreements to Qualcomm's competitors" and concludes that Arm "benefited through the receipt of licensing fees and royalties from CMN-Kampos technology that included value related to the Nuvia Confidential Information."⁵¹ But Dr. Kennedy fails to identify any evidence that any licensing fees and/or royalties Arm received for its CMN products are in any way related to the inclusion of any one or more At-Issue CMN Features, that the inclusion of any one or more At-Issue CMN Features drove demand for any Arm CMN products, or that Arm emphasized or specifically marketed any one or more of the At-Issue CMN Features. For example, Dr. Kennedy does not identify any Arm licensee whose decision to license any CMN product at any point in time was based, in whole or in any part, on the presence of any one or more of the At-Issue CMN Features. This is unsurprising, given the limited use of features and features requested only by Nuvia. I am not aware of any such evidence and, instead, as further discussed below, my understanding is that licensing fees and royalties Arm received for its CMN products are not related to the inclusion of the At-Issue CMN Features. Importantly, Dr. Kennedy's assumption

⁵¹ Kennedy Counterclaim Report, pp. 21 – 22.

indicates that there are no damages to Nuvia or Qualcomm under the relevant legal standard as I understand it. As such, given that the relevant information pertaining to damages to Nuvia would be within Nuvia's possession, Dr. Kennedy's statements regarding a lack of information are misguided.

33. I understand that the At-Issue CMN Features are not key or important features of CMN-700. For example, I understand from the June 10, 2024 Rebuttal Expert Report of Robert Colwell, Ph.D. ("Colwell Rebuttal Report") that the At-Issue CMN Features "have limited value and utility in terms of the overall CMN product."⁵² For example, it is my understanding that:

- [REDACTED] features were only requested by Nuvia and are not in use by any non-Nuvia Arm partners.⁵³ This confirms that there has been no benefit to Arm beyond its relationship to Nuvia, and no corresponding harm to Nuvia (given that Nuvia obtained the use of a feature it requested).
- [REDACTED] feature, while requested by some Arm partners, is only known to be in use by Nuvia.⁵⁴ This confirms that there has been no benefit to Arm beyond its relationship with Nuvia, and no harm to Nuvia (given Nuvia obtained the use of a feature it requested).
- [REDACTED] features were requested by other Arm partners, but their significance in driving demand for CMN as a whole is minimal.⁵⁵ This confirms that any benefit to Arm is not attributable to Nuvia's request.

34. Dr. Kennedy's assumption ignores that certain At-Issue CMN Features are no longer available in CMN-700, or that there is no indication that other Arm customers use certain of the At-Issue CMN Features. As discussed above, I understand from discussions with Mr. Werkheiser that he is not aware of any Arm partners, aside from Qualcomm/Nuvia, using (or in the past having used) certain of the At-Issue CMN Features such as [REDACTED]

⁵² Colwell Rebuttal Report, p. 17.

⁵³ Colwell Rebuttal Report, pp. 23 and 28; Discussions with Mark Werkheiser..

⁵⁴ Colwell Rebuttal Report, p. 21.

⁵⁵ Colwell Rebuttal Report, pp. 33 - 34 and 36 - 37.

[REDACTED]⁵⁶ I also understand that certain of these features are currently disabled—specifically, [REDACTED]⁵⁷ I also understand that certain of the At-Issue CMN Features were previously requested by other Arm partners, but were never implemented (indicating their absence did not impact partners’ acceptance of prior versions of CMN)—specifically, [REDACTED]

[REDACTED]⁵⁸ [REDACTED]
[REDACTED]
[REDACTED]

[REDACTED] Given the lack of demand, use, or availability of many of the At-Issue CMN Features, Dr. Kennedy’s assumption that these features provided a benefit to Arm is unsupported. At best, these were features from which Qualcomm/Nuvia benefited. For example, Mr. Werkheiser testified that the requested CMN features “did improve the fabric for [Nuvia’s] use cases, and most—most of the features were targeted to their use case.”⁶⁰ Mr. Larri testified that the features “may have had some incremental benefit. Certainly, they had the benefit of keeping Nuvia happy as a customer, because Nuvia was asking for them, and we certainly strive to keep our customer happy.”⁶¹ [REDACTED]
[REDACTED]
[REDACTED]

35. In addition, based on my discussions with Mr. Defilippi, I understand the primary aspects of CMN-700 that are touted over previous versions include its [REDACTED]

⁵⁶ Discussions with Mark Werkheiser.

⁵⁷ Discussions with Mark Werkheiser.

⁵⁸ Discussions with Mark Werkheiser.

⁵⁹ [REDACTED]
⁶⁰ Deposition of Mark Werkheiser, December 7, 2023, p. 54.

⁶¹ Deposition of Guy Larri, May 10, 2024, p. 197.

⁶² [REDACTED]

capabilities are separate and independent from the At-Issue CMN Features.⁶⁵ Further, I note that the CMN-700 [REDACTED] identifies numerous [REDACTED]⁶⁶ each of which I understand are separate and independent of the At-Issue CMN Features.⁶⁷ Indeed, I understand that the absence of the At-Issue CMN Features would not have been a hinderance to Arm's ability to release CMN-700 when it did.⁶⁸ The absence of evidence that the At-Issue CMN Features were necessary to release CMN-700 or that a particular licensee would not have licensed CMN-700 if it did not include the At-Issue CMN Features, contradicts Dr. Kennedy's underlying premise that the At-Issue CMN Features provide any value to Arm's ability to obtain license fees and royalties for CMN-700 and that Arm would have had to redevelop the At-Issue CMN Features in the "but-for" scenario posed by Dr. Kennedy.

ii. **There is no evidence that Arm would have redeveloped the At-Issue CMN Features post-termination**

36. Dr. Kennedy also states that “[i]n the but-for world, where it is assumed that Arm would have ceased using the Nuvia Confidential Information, Arm would have had to incur expenses and development time to duplicate the efforts that Arm had previously undertaken in

⁶³ Discussions with Jeff Defilippi.

64 Mr. Larri testified that “[t]he key change from the CMN Rhodes product to the Kampos product in its various releases was that the Kampos product [REDACTED] whereas the earlier Rhodes product [REDACTED] but did not [REDACTED]. That was the most significant change from Rhodes to Kampos, and the most significant commercial driver for ARM to move forward and develop Kampos was the need to [REDACTED]” (see Deposition of Guy Larri, May 10, 2024, pp. 83 – 84). Mr. Larri also testified that “[i]t was supporting the latest revision of the [REDACTED] (see Deposition of Guy Larri, May 10, 2024, p. 194).

⁶⁵ Discussions with Jeff Defilippi.

⁶⁶ Arm Neoverse CMN-700 Coherent Mesh Network,

⁶⁷ Discussions with Jeff Defilippi.

⁶⁸ Discussions with Jeff Defilippi and Mark Werkheiser.

developing the Nuvia Confidential Information and associated At-Issue CMN Features.”⁶⁹ Dr. Kennedy also states that “during this development time or head start period, Arm would have benefited from receiving licensing fees and royalties related to the At-Issue CMN Features.”⁷⁰ Dr. Kennedy’s assumption that Arm would have to “duplicate the efforts that [it] had previously undertaken in developing the Nuvia Confidential Information and associated At-Issue CMN Features” is fundamentally flawed because there is no evidence that if Arm was forced to remove the At-Issue CMN Features from its CMN product post-termination, Arm would have made any investment to redevelop and reimplement the features. As discussed above, available evidence indicates that the At-Issue CMN Features did not drive the use of CMN-700 and their absence would not have impacted Arm’s licensing of CMN-700 (or any other Arm product). Accordingly, there is no basis to assume Arm would have had to reimplement any of the At-Issue CMN Features if Arm had removed them upon termination of the Nuvia ALA and TLA.

37. Further, Dr. Kennedy fails to identify the alleged “development time or head start period” for any of the At-Issue CMN Features or any evidence that Arm previously “incur[red] expenses and development time ... in developing the Nuvia Confidential information.”⁷¹ Indeed, Dr. Kennedy does not provide any evidence for the costs, time, or timeline for the development of any particular CMN feature. Instead, Dr. Kennedy provides a conclusionary statement that Arm would have incurred expenses and development time, without addressing what this cost would even entail, much less how it is a measure of any benefit to Arm, nor does he explain how this would be an appropriate measure of harm to Qualcomm or Nuvia. Further, as discussed above, there would have been no reason for Arm to redevelop the At-Issue CMN Features.

⁶⁹ Kennedy Counterclaim Report, pp. 21 – 22.

⁷⁰ Kennedy Counterclaim Report, p. 22.

⁷¹ Kennedy Counterclaim Report, pp. 21 – 22.

Additionally, as discussed later in this report, even if there was a need to redevelop the At-Issue CMN Features, the time needed to do so would have been relatively minimal, as Mr. Larri discussed in his deposition.⁷²

iii. Dr. Kennedy's damages framework is based on the alleged benefits to Arm and fails to identify any alleged damages or harm to Nuvia or Qualcomm

38. Importantly, the Kennedy Counterclaim Report provides no indication of harm to Nuvia or Qualcomm as a result of the alleged actions by Arm. Specifically, Dr. Kennedy provides no indication that Nuvia (or Qualcomm) has lost sales or profits due to Arm's alleged actions, which is not surprising given the absence of any evidence that Nuvia or Qualcomm license CMN features, or even CMN, to others. Further, Dr. Kennedy has provided no indication that Nuvia (or Qualcomm) has been unable to license the Nuvia Confidential Information and/or At-Issue CMN Features to third parties, therefore depriving Nuvia (or Qualcomm) of license fees or royalties, which again is not surprising, given the absence of licensing of CMN features, or even CMN, by Nuvia or Qualcomm to others. In addition, Dr. Kennedy provides no indication that Nuvia (or Qualcomm) has been unable to implement the Nuvia Confidential Information and/or At-Issue CMN Features in its own products given Arm's implementation. Dr. Kennedy also provides no indication of the research and development expenses that Nuvia incurred to develop the Nuvia Confidential Information and/or At-Issue CMN Features, which could provide a measure of value of the Nuvia Confidential Information and/or At-Issue CMN Features.

[REDACTED]

[REDACTED]

[REDACTED] ■ That

⁷² Deposition of Guy Larri, May 10, 2024, pp. 191 and 196 – 197.

⁷³ [REDACTED]

Dr. Kennedy provides no assessment of these types of harm or relevant information calls into question the underlying value, if any, of the At-Issue CMN Features. [REDACTED]

[REDACTED] Finally, Dr. Kennedy, in failing to adequately address how Nuvia or Qualcomm have been harmed, fails to address at all whether any measure of harm would be inadequate to compensate Nuvia or Qualcomm. Dr. Kennedy's flawed analysis of the benefit to Arm does not cure this deficiency.

C. Kennedy's Purported Methodology Is Flawed

39. In addition to his flawed assumptions, Dr. Kennedy fails to provide a cognizable methodology to adequately analyze the appropriate damages owed to Defendants to compensate for any alleged breach by Arm. In particular, Dr. Kennedy's methodology (1) makes unsupported claims regarding the ability to identify Arm licensees, (2) relies on an unsupported identification of relevant Arm license fees, (3) fails to consider relevant documents valuing CMN, (4) fails to consider documents valuing new CMN features, (5) ignores available evidence valuing the At-Issue CMN features, and (6) fails to identify the relevant time period for damages.

i. Kennedy's claims related to identification of relevant Arm licensees are unsupported

40. Dr. Kennedy asserts that "[t]he first step in [his] analysis is to identify the relevant licenses where Arm licensees have a license to at least CMN-Kampos."⁷⁵ Dr. Kennedy also contends that certain requested information was not available and that he has "reviewed the available information produced in this matter to date and describe[s] such information in the

⁷⁴ [REDACTED]

⁷⁵ Kennedy Counterclaim Report, p. 24.

following paragraphs.”⁷⁶

41. As an initial matter, identifying Arm licensees is irrelevant because that information is only relevant to the benefit Arm would have received, and would not help measure the harm to Qualcomm or Nuvia. Nevertheless, despite claiming not to have relevant information, Dr. Kennedy goes on to identify a number of CMN-700 licensees: [REDACTED]

[REDACTED]⁷⁷ As such, while claiming insufficient information, Dr. Kennedy was able to identify Arm’s CMN-700 licensees, yet chose to do nothing with the available information.

ii. Kennedy’s claims related to identification of relevant Arm licensees’ fees and royalties are unsupported

42. Dr. Kennedy states that “[t]he next step in [his] analysis is to identify the total license fees, license fees attributable to CMN-Kampos, royalties attributable to CMN-Kampos, and the terms of the agreement.”⁷⁸ Dr. Kennedy goes on to claim that if he had certain licensing documents that were not produced by Arm, he “would have analyzed the fees, royalties, and terms to identify revenue specifically related to CMN-Kampos.”⁷⁹ Despite this claim, Dr. Kennedy recognizes such information in the Nuvia TLA, Qualcomm TLA [REDACTED] and [REDACTED] which indicates that Arm has received [REDACTED] in royalty payments through the end of 2023 for CMN-700.⁸⁰

43. Similar to other aspects of Dr. Kennedy’s opinions, this claim by Dr. Kennedy concerns the wrong frame of reference. An identification of Arm licensees’ fees and royalties is

⁷⁶ Kennedy Counterclaim Report, p. 24.

⁷⁷ Kennedy Counterclaim Report, pp. 24 – 25.

⁷⁸ Kennedy Counterclaim Report, p. 25.

⁷⁹ Kennedy Counterclaim Report, p. 25.

⁸⁰ Kennedy Counterclaim Report, pp. 25 – 26.

only helpful for measuring the benefit to Arm, and not the harm to Nuvia and Qualcomm. Moreover, a proper metric in measuring that benefit, were it relevant, would be the royalties attributable to specific CMN features given the number of features and abundant absence of use of particular features. As such, even under Dr. Kennedy's framing, the demand for said incremental and often unused features is minimal.

44. I understand that for many of the licensees identified by Dr. Kennedy, they have a [REDACTED] license from Arm that would [REDACTED].⁸¹

For example, Mr. Larri testified that “there may be a [REDACTED]

[REDACTED]”⁸² I understand there are [REDACTED] for CMN-700, including [REDACTED]⁸³ Additionally, several of the entities do not have a license to distribute products including CMN-700, such as [REDACTED]

[REDACTED].⁸⁴ I note that [REDACTED] includes information related to [REDACTED] which Dr. Kennedy ignored. I also note that [REDACTED] also includes information regarding [REDACTED] [REDACTED], which Dr. Kennedy does not discuss in his report.⁸⁵

⁸¹ Discussions with Ying Yau.

⁸² Deposition of Guy Larri, May 10, 2024, p. 94 (see also pp. 94 – 95).

⁸³ Discussions with Ying Yau.

⁸⁴ Discussions with Ying Yau;

⁸⁵ Based on discussions with Ying Yau, I understand that [REDACTED] identifies the royalty payments that Arm has received for any licensee that has a license to CMN-700 with a specific royalty rate associated with CMN-700.

iii. Kennedy failed to consider available documents to value the new features in CMN-700

45. Dr. Kennedy states that “[a]fter identifying the relevant license fees and royalties, the next step is to quantify the value attributable to the new features including the At-Issue CMN Features found in CMN-Kampos and previous technologies like CMN-Rhodes.”⁸⁶ Dr. Kennedy goes on to assert that with [REDACTED], he would “apply the CMN-Kampos price premium to the CMN-Kampos license fees and royalties to determine the value attributable to the new features found in CMN-Kampos.”⁸⁷

46. However, Dr. Kennedy could have considered the evidence he cites in his report when comparing CMN-650 and CMN-700. Specifically, Dr. Kennedy describes that in the Nuvia TLA, “Arm identified a [REDACTED] to CMN-Rhodes with an upgrade option to CMN-Kampos and payable over five years.”⁸⁸ As shown in the [REDACTED] to the Nuvia TLA [REDACTED], the [REDACTED]⁸⁹ Indeed, Figure 4 of the Kennedy Counterclaim Report indicates CMN-Kampos-Max is subject to a [REDACTED] from CMN-Rhodes-Max.⁹⁰

47. Nevertheless, Dr. Kennedy’s price premium approach is flawed because he fails to consider that factors other than new features could attribute to a price premium. Several factors could contribute to a change in price. For example, compatibility with the latest Arm architecture could affect pricing. As discussed previously in this report, CMN-700 is compatible with ARM V9, whereas CMN-650 is compatible only up through ARM V8. As such, Dr. Kennedy has not explained how he would account for this significant difference between CMN-650 and CMN-700

⁸⁶ Kennedy Counterclaim Report, p. 26.

⁸⁷ Kennedy Counterclaim Report, p. 26.

⁸⁸ Kennedy Counterclaim Report, p. 25 (citing QCARM_0275743 – 763 at 757 and ARM_00003621 – 624).

⁸⁹ ARM_00003621 – 624 at 623.

⁹⁰ Kennedy Counterclaim Report, p. 25 (citing ARM_00082871 – 723 and ARM_00082874, tab “Pricing Model”).

and whether any price premium can be attributed to “new features” and not other factors such as licensees’ ability to implement CMN-700 into the latest version of Arm’s products.

48. Arm’s licensing model could also affect pricing. As discussed in my Initial Report, Arm’s licensing is sophisticated and based on an ecosystem where many factors could influence the fluctuation of pricing.⁹¹ Dr. Kennedy fails to account for these or any other factors and their impact on pricing.

49. A price premium could also be impacted by economic factors such as general inflation. As Arm stated in its 2nd Amended 2023 F-1 filing, “[d]emand for our products and services is largely dependent on the semiconductor and electronics industries, which are volatile, intensely competitive and generally characterized by declining ASPs over the life of a generation of chips. The effect of those prices decreases is compounded by the fact that our royalty rates generally decrease with volume of sales increases []. Additionally, demand for our products and services decrease if growth in the semiconductor or electronics industries slows or declines.”⁹² The fact that Dr. Kennedy does not account for (or even mention) these types of impacts, and the other issues discussed above, calls his methodology into question.

iv. Kennedy ignored evidence of value of At-Issue CMN Features in CMN-700

50. Dr. Kennedy states that “[a]nother step in [his] analysis is to consider the technical importance of the Nuvia Confidential Information relative to all of the new features found in CMN-Kampos.”⁹³ After claiming that certain information was not produced by Arm, Dr. Kennedy asserts that “[i]f sufficient information to conduct an apportionment had been produced and therefore an apportionment could be conducted, then [he] would apply this apportionment

⁹¹ Initial Report, pp. 17 and 37.

⁹² ARM_01259705 – 105 at 732.

⁹³ Kennedy Counterclaim Report, p. 26.

which would reflect the relative value of the At-Issue CMN Features to all of the new features in CMN-Kampos, to the value attributable to the new features found in CMN-Kampos, resulting in the value attributable to the At-Issue CMN Features.”⁹⁴

51. However, Dr. Kennedy does not explain why this step must solely rely on information produced by Arm. In fact, Dr. Kennedy relies on a conversation with Ram Srinivasan (Senior Director at Qualcomm) in his discussion of this step.⁹⁵ Further, in my experience, the information related to this step described by Dr. Kennedy could be considered as part of a technical expert’s report, yet the Annavaram Report includes no such analysis. Dr. Kennedy’s failure to set out to perform or present a technical apportionment, while claiming it would be necessary, reflects another example as to why his methodology is fundamentally flawed.

52. Further, as discussed in this report, evidence and testimony indicate the At-Issue CMN Features have little to no additional value to CMN-700 licensees—perhaps with the exception of Nuvia, which would not support harm to Nuvia (instead a benefit) or a benefit to Arm (instead, the expense of adding features for a single licensee without further compensation). Even so, as discussed previously, Nuvia’s witness described the At-Issue CMN Features as “incremental.” For example, there is no evidence that the primary drivers of the adoption of CMN-700 and its key features are related to the At-Issue CMN Features. In addition, CMN-700 licensees would not have adopted CMN-700 any differently without the At-Issue CMN Features given their lack of use or availability. Finally, as I understand from Dr. Colwell, each of the At-Issue CMN Features is unimportant to the operation of CMN and would not be a strong driver of adoption by Arm partners.⁹⁶

⁹⁴ Kennedy Counterclaim Report, p. 27.

⁹⁵ Kennedy Counterclaim Report, p. 27.

⁹⁶ Discussions with Dr. Robert Colwell.

v. Kennedy failed to identify the relevant time period

53. Dr. Kennedy states that “Arm’s benefit received would be limited to the time period when Arm would independently develop the At-Issue CMN Features, and [he] would apportion the value attributable to the At-Issue CMN Features to this time period only.”⁹⁷ However, the Kennedy Counterclaim Report omits the amount of time purportedly necessary for Arm to redevelop the At-Issue CMN Features. I note that of the information identified in paragraph 56 of the Kennedy Counterclaim Report that Dr. Kennedy states he does not have, none are related to the amount of time required to develop or redevelop the At-Issue CMN Features. Nevertheless, given that Nuvia and Qualcomm are asserting alleged misuse of Nuvia’s Confidential Information and At-Issue CMN Features, setting forth the time to develop such confidential information and features would presumably be available to Nuvia or Qualcomm. For example, Nuvia should know when it allegedly first requested the At-Issue CMN Features, and when those features were first implemented as Nuvia was also involved in reoccurring meetings with Arm concerning its CMN product and its features.⁹⁸ Yet, Dr. Kennedy does not analyze information from Nuvia or Qualcomm. In my experience, the information related to the time to develop or redevelop the At-Issue CMN Features could be considered as part of a technical expert’s report, yet the Annavaram Report includes no such analysis.

54. In any event, Dr. Kennedy ignored testimony from Mr. Larri related to the time it took Arm to develop features requested by Nuvia. Specifically, Mr. Larri testified that it took “[h]alf a person year, so half a year of one full-time engineer.”⁹⁹ By way of comparison, Mr. Larri testified that in total, “there had been a team of [REDACTED] working on CMN over [REDACTED]

⁹⁷ Kennedy Counterclaim Report, p. 27.

⁹⁸ Discussions with Jeff Defilippi and Mark Werkheiser.

⁹⁹ Deposition of Guy Larri, May 10, 2024, p. 191.

██████" and that "██████ years of work for the development of CMN was a conservative estimate."¹⁰⁰ Further, Mr. Larri testified that "many of the requests [from Nuvia] were of this type of category of taking something and just making it deeper or a bit wider, not really any kind of fundamental change to the design, and that most of the—well, all of the suggestions that had uniquely come from Nuvia were quite simple. In the context of something that has ██████████ ██████████ of technical reference manual, you know, this kind of—they were very, very small incremental changes on top of something that was already big and complex."¹⁰¹ Similarly, Mr. Larri testified that Nuvia "had a number of different goals and they were all quite small changes on a very complex system that already existed."¹⁰²

D. Conclusion

55. In his conclusion, Dr. Kennedy states that "had Arm developed the Nuvia Confidential Information independently after the termination of the Nuvia ALA and Nuvia TLA, then Arm would not have inappropriately received more license fees and royalties than it should have."¹⁰³ However, as discussed in this report, Dr. Kennedy provides no evidence or analysis to substantiate this assumption. As such, Dr. Kennedy appears to accept this assertion as fact. As discussed in this report, numerous documents and testimony call into question Dr. Kennedy's assumptions and indicate that the At-Issue CMN Features have little to no value to CMN-700 outside of Nuvia's intended use.

VIII. OTHER ISSUES

56. This report represents my analysis, opinions, and conclusions at this time and is based on information available to me as of the date above. The citations listed in this report are

¹⁰⁰ Deposition of Guy Larri, May 10, 2024, p. 191.

¹⁰¹ Deposition of Guy Larri, May 10, 2024, pp. 196 – 197.

¹⁰² Deposition of Guy Larri, May 10, 2024, p. 199.

¹⁰³ Kennedy Counterclaim Report, p. 27.

illustrative, and as part of my analysis, I also considered the additional documents and other information listed on Schedule 2. If additional information or testimony becomes available to me, I may revise or supplement my analysis, opinions, and conclusions, and I may modify or supplement my report as necessary. I may testify at trial regarding any related matter raised by the parties after the date of this report if asked to do so by the Court or the parties' attorneys. I may be asked to develop additional schedules or exhibits for trial purposes related to my analysis, opinions, and conclusions. I may also be asked to develop and rely on demonstratives at trial or any pre-trial proceeding. I may also be asked to develop additional schedules or exhibits if asked to do so by the Court or the parties' attorneys, post-trial. This report is intended solely for use in the above-referenced litigation and is not to be used for any other purpose.

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W. Todd Schoettelkotte is a Senior Managing Director of Ocean Tomo, a part of J.S. Held LLC, a global consulting firm providing specialized technical, scientific, financial, and advisory services. Mr. Schoettelkotte has more than 25 years of experience in the evaluation and quantification of economic damages arising from patent, copyright and trademark infringement, and trade secret misappropriation disputes. His clients have included numerous Fortune 500 companies in a wide variety of industries including semiconductor, telecommunication, energy, consumer products, life sciences and computers (hardware, software and the internet). Mr. Schoettelkotte has been recognized by Intellectual Asset Management Magazine as one of the leading patent damages experts in the United States. Mr. Schoettelkotte's background is in accounting, finance and economics, and he has a specific, focused understanding of those issues integral to the valuation and management of intellectual property.

Intellectual Property Valuation

Mr. Schoettelkotte has directed numerous valuation projects related to patents, trademarks and trade secrets. A significant portion of his practice is focused on the determination of royalty rates and terms for licensing agreements. Additionally, Mr. Schoettelkotte has conducted numerous studies involving lost profits and unjust enrichment.

In the process of assisting clients in the valuation of intellectual property assets, Mr. Schoettelkotte has participated in the identification and review of business plans, market studies, financial documents and other related information.

Patent, Copyright and Trademark Infringement

Mr. Schoettelkotte has performed market analyses/studies wherein the patented, trademarked or copyrighted product is sold, assessed lost profits stemming from alleged infringements, evaluated the contribution of the patented process/method to the end product and established the economic value of the underlying intellectual property.

Mr. Schoettelkotte is skilled in the application of the Georgia-Pacific factors to the determination of reasonable royalty rates. He has determined reasonable royalty rates within infringement suits on many occasions in numerous industries. Over the course of his career, Mr. Schoettelkotte has reviewed hundreds of license agreements, providing a broad frame of reference for reasonable royalty damages analyses. Mr. Schoettelkotte has testified in federal and state court and arbitration proceedings on matters involving intellectual property valuation, lost profits, reasonable royalty and economic damages issues.

Articles and Presentations

"Intellectual Property Damages," Chicago-Kent College of Law, October 15, 2019

"Damages in Other Areas of Intellectual Property," The University of Arizona IP Conference, March 5, 2018

W. Todd Schoettelkotte

"Impact of Recent Court Cases on 'Real World' Royalty Rates," LES (USA & Canada) Houston Chapter, July 20, 2017

"What is Discoverable and Admissible for Damages, Willfulness and Other Purposes," Intellectual Property Owners Association, March 21, 2011

"Strategies in Intellectual Property," Chicago Kent, College of Law, Spring 2004 – 2010

Damages, Part II: "Litigation Strategies" – 15th Annual Advanced Patent Law Institute - University of Texas School of Law, October 28-29, 2010

"IP Damages and Valuation," Global Intellectual Property Management, Georgetown University Law Center, July 2, 2008

"Keys for Effectively Working with Your Damages Expert Throughout the Litigation Life Cycle," Houston Bar Association, March 22, 2007

"Advanced Evidence and Discovery – Working With Experts From Start To Finish" – Texas Bar Association, April-May 2006

"Trademarks – Financial Disclosure and Corporate Governance" – International Trademark Association, Emerging Issues in Trademark Law Forum, February 2-3, 2006

"Valuation of IP – A Licensing Perspective" – Lighthouse Seminar Group, IP Licensing Nuts & Bolts, March 3, 2005

"Measuring the Value of Damages in Trademark Infringement Claims" – DuPont's 18th Annual CLE Intellectual Property Law Seminar, October 12, 2004

"Measuring the Value of Damages in Patent and Trademark Claims" – Houston CPA Society, September 2004

"Measuring Damages in Trademark Infringement and Related Claims in Light of Recent Court Decisions" – The 19th Annual Intellectual Property Law Conference – American Bar Association, April 1, 2004

"Intellectual Property Damages: Patents & Trademarks" – Houston CPA Society "Litigation and Valuation Services Committee," January 28, 2004

Co-Author: "Accounting for Attorneys" – University of Oregon School of Law, November 12, 2003

"What are the Financial Stakes in Litigation? What are the Costs and the Return on Investment (ROI) That Can Be Expected? The Question of Intangible Returns?" – 2003 Fourth International Conference on Intellectual Property by CNCPI, October 7, 2003, Paris, France

"Current Issues in the Analysis of Reasonable Royalties in Patent Infringement Actions" – 2003 Licensing Executives Society Annual Meeting, September 24, 2003

Co-Author FTI Consulting Training Course: "Calculating Damages in Patent Infringement – A Lost Profits and Reasonable Royalty Case Study," July 17, 2003



W. Todd Schoettelkotte
Four Year List of Testimony
As of June 2024

CASE DESCRIPTION / TYPE OF TESTIMONY

CMC Materials, LLC v. DuPont de Nemours., et al.; U.S. District Court, District of Delaware (Wilmington), Rebuttal Expert Report, Deposition

BlueRadios, Inc. v. Kopin Corporation, Inc.; U.S. District Court, District of Colorado (Denver), Rebuttal Expert Report, Deposition, Supplemental Rebuttal Expert Report, Deposition, Trial

Continuous Composites, Inc. v. Markforged, Inc.; U.S. District Court, District of Delaware, Expert Report, Reply Report, Deposition, Trial

Lindis Biotech GmbH v. Amgen Inc.; U.S. District Court, District of Delaware, Initial Report, Expert Report, Reply Report, Deposition

In the Matter of Certain Semiconductor Devices, and Methods of Manufacturing Same and Products Containing the Same (Respondents); U.S. International Trade Commission, Washington, D.C., Expert Report, Deposition, Hearing

Demaray LLC v. Samsung Electronics Co. Ltd., et al.; U.S. District Court, Western District of Texas (Waco), Rebuttal Expert Report, Deposition, Supplemental Report, Deposition, Second Supplemental Report, Deposition, Trial

Ningde Amperex Technology Limited v. Zhuhai CosMX Battery Co., Ltd., et al.; U.S. District Court, Eastern District of Texas (Marshall), Initial Report, Rebuttal Expert Report, Deposition, Trial

HID Global Corporation v. Vector Flow., et al.; U.S. District Court, District of Delaware (Wilmington), Expert Report, Reply Report, Deposition, Trial

Persawvere, Inc. v. Milwaukee Electric Tool, Corporation; U.S. District Court, District of Delaware (Wilmington), Rebuttal Expert Report, Deposition, Trial

Beacon Navigation GmbH v. Bayerische Motoren Werke AG; BMW of North America, LLC and BMW Manufacturing Co., LLC; U.S. District Court, Southern District of Michigan, Expert Report, Deposition

Plastipak Packaging, Inc. v. Nestlé Waters North America, Inc.; U.S. District Court, Eastern District of Virginia (Alexandria), Opening Expert Report, Rebuttal Expert Report, Supplemental Expert Report, Supplemental Rebuttal Expert Report, Deposition

Ollnova Technologies Limited v. ecobee Technologies, ULC d/b/a Ecobee; U.S. District Court, Eastern District of Texas (Marshall), Rebuttal Expert Report, Deposition, Trial

EIS, Inc. v. IntiHealth GER GmbH, et al.; U.S. District Court, District of Delaware, Expert Report, Rebuttal Expert Report, Commercial Success Report, Reply Report, Trial

Bay Materials, LLC v. 3M Company, U.S. District Court, District of Delaware (Wilmington), Declaration, Deposition, Commercial Success Report, Deposition



**W. Todd Schoettelkotte
Four Year List of Testimony
As of June 2024**

CASE DESCRIPTION / TYPE OF TESTIMONY

Fate Therapeutics, Inc., et al. v. Shoreline Biosciences, Inc., et al.; U.S. District Court, Southern District of California (San Diego), Rebuttal Expert Report, Deposition

Delta Air Lines, Inc. v. Marriott International, Inc.; U.S. District Court, Northern District of Georgia (Atlanta), Rebuttal Expert Report, Supplemental Rebuttal Report, Deposition

Textron Innovations Inc. v. SZ DJI Technology Co., Ltd., et al.; U.S. District Court, Western District of Texas (Waco), Expert Report, Deposition, Supplemental Expert Report, Trial

VoIP-Pal.com, Inc. v. Verizon Communications Inc., et al.; U.S. District Court, Western District of Texas (Waco), Rebuttal Expert Report, Deposition

Ragnarok Game, LLC and ESDFOS, LLC v. ZeniMax Media Inc., et al.; Superior Court of the State of California, County of Los Angeles, Central District, Opening Expert Report, Rebuttal Expert Report, Deposition

DivX, LLC v. Harman International Industries, Inc.; New York Supreme Court, New York County, Expert Report, Rebuttal Expert Report, Deposition

Shimon Maimon v. Lockheed Martin Corporation; Judicial Arbitration and Mediation Services, Rebuttal Expert Report, Deposition, Arbitration

WSOU Investments, LLC d/b/a Brazos Licensing and Development v. ZTE Corporation; U.S. District Court, Western District of Texas (Waco), Rebuttal Expert Report, Deposition

Wonderland Switzerland AG v. Evenflo Company, Inc.; U.S. District Court, District of Delaware (Wilmington), Expert Report, Reply Report, Deposition, Supplemental Expert Report, Trial

NNCrystal US Corporation and The Board of Trustees of The University of Arkansas v. Nanosys, Inc.; U.S. District Court, District of Delaware, Expert Report, Reply Report, Deposition

Pavemetrics Systems, Inc. v. Tetra Tech, Inc. and Tetra Tech Tas Inc.; U.S. District Court, Central District of California (Los Angeles), Expert Report, Deposition, Trial

Global Tubing, LLC v. Tenaris Coiled Tubes, LLC and Tenaris, S.A.; U.S. District Court, Southern District of Texas (Houston), Expert Report, Deposition

The Cookie Department, Inc. v. The Hershey Company, One Brands, LLC; U.S. District Court, Northern District of California (Oakland), Rebuttal Expert Report, Deposition

Unirac, Inc. v. EcoFasten Solar, LLC and Esdec, Inc.; U.S. District Court, District of Delaware, Expert Reports, Deposition



W. Todd Schoettelkotte
Four Year List of Testimony
As of June 2024

CASE DESCRIPTION / TYPE OF TESTIMONY

In the Matter of Certain Integrated Circuits, Chipsets, and Electronic Devices, and Products Containing the Same (Respondents); U.S. International Trade Commission, Washington, D.C., Rebuttal Expert Report, Deposition

In the Matter of Certain High-Density Fiber Optic Equipment and Components Thereof (Complainant); U.S. International Trade Commission, Washington, D.C., Expert Report, Deposition, Witness Statement, Hearing; Enforcement Proceeding - Expert Report, Supplement to the Expert Report, Deposition, 2nd Supplement to the Expert Report, 3rd Supplement to the Expert Report, Witness Statement, 4th Supplement to the Expert Report, Supplement to Witness Statement, Hearing

Blue Mountain Holdings, Ltd., et al. v. Bliss Nutraceuticals LLC, et al.; U.S. District Court, Northern District of Georgia (Atlanta), Expert Report, Deposition

Gibson Brands, Inc. v. Armadillo Distribution Enterprises, Inc. and Concordia Investment Partners, LLC; U.S. District Court, Eastern District of Texas (Sherman), Rebuttal Expert Report, Deposition, Supplemental Rebuttal Expert Report, Trial

Conformis, Inc. v. Medacta USA, Inc. and Medacta International SA; U.S. District Court, District of Delaware, Rebuttal Expert Report, Supplemental Rebuttal Expert Report, Deposition

In the Matter of Certain Silicon Photovoltaic Cells and Modules with Nanostructures, and Products Containing Same (Respondents); U.S. International Trade Commission (Washington, D.C.), Expert Report, Deposition, Witness Statement, Hearing

EcoFactor, Inc. v. Google LLC; U.S. District Court, Western District of Texas (Waco), Expert Report, Deposition, Supplemental Report, Trial, Declaration

G.W. Lisk Company, Inc. v. GITS Manufacturing Company; U.S. District Court, Southern District of Iowa (Central); Expert Report, Reply Report, Deposition

American Eagle Outfitters, Inc. and Retail Royalty Company v. Walmart, Inc.; U.S. District Court, Western District of Pennsylvania (Pittsburgh), Expert Report, Rebuttal Report, Deposition

Simply Wireless, Inc. v. T-Mobile US, Inc., et al.; U.S. District Court, Eastern District of Virginia (Alexandria), Expert Report, Reply Report, Deposition, Sur-Sur Reply Report

Gentex Corporation v. Galvion LTD and Galvion Inc.; U.S. District Court, District of Delaware (Wilmington), Expert Report, Reply Report, Deposition

Kirsch Research and Development, LLC v. DuPont de Nemours, Inc., FT Synthetics, Inc. and Atlas Roofing Corporation; U.S. District Court, Eastern District of Texas (Texarkana), Expert Report, Deposition

Malvern PanAnalytical Inc. v. TA Instruments-Waters LLC and Waters Technologies Corporation; U.S. District Court, District of Delaware (Wilmington), Expert Report, Rebuttal Report, Reply Report, Deposition

Finalrod IP, LLC v. Endurance Lift Solutions, Inc.; U.S. District Court, Eastern District of Texas (Marshall), Expert Report, Deposition



W. Todd Schoettelkotte
Four Year List of Testimony
As of June 2024

CASE DESCRIPTION / TYPE OF TESTIMONY

Pierce Manufacturing, Inc. and Oshkosh Corporation v. E-One, Inc. and REV Group, Inc.; U.S. District Court, Middle District of Florida (Tampa), Declaration, Expert Report, Deposition, Trial

Polar Electro Oy v. Suunto Oy, et al.; U.S. District Court, District of Utah (Central), Expert Report, Deposition

Wonderland Switzerland AG v. Evenflo Company, Inc., et al.; U.S. District Court, District of Delaware (Wilmington), Expert Report, Reply Report, Deposition, Trial

Lufkin Industries, Inc. v. International Business Machines Corporation, et al.; 159th Judicial District Court of Angelina County, Texas, Expert Report #1, Supplemental Report #1, Expert Report #2, Supplemental Report #2, Deposition

The Hillman Group, Inc. v. KeyMe, LLC; U.S. District Court, Eastern District of Texas (Marshall), Expert Report, Deposition #1, Consolidated Report, Deposition #2

Team Worldwide Corporation v. Academy, LTD d/b/a Academy Sports + Outdoors, et al.; U.S. District Court, Eastern District of Texas (Marshall), Expert Report, Rebuttal Report, Deposition #1, Deposition #2, Supplemental Report

Nevro Corp. v. Boston Scientific Corporation, et al.; U.S. District Court, Northern District of California (San Francisco), Expert Report, Supplemental Report, Deposition, Declaration

Carnegie Institution of Washington, et al. v. Pure Grown Diamonds, Inc., et al.; U.S. District Court, Southern District of New York (Foley Square), Expert Report, Supplemental Report, Deposition

In the Matter of Certain High-Density Fiber Optic Equipment and Components Thereof (Complainant); U.S. International Trade Commission, Washington, D.C., Expert Report, Deposition, Witness Statement, Hearing

Nissei ASB Co. and Nissei ASB Machine, Co., LTD. v. R&D Tool & Engineering Co.; U.S. District Court, Western District of Missouri (Western), Expert Report, Reply Report, Deposition

Jager Pro Incorporated v. Bull Creek Welding and Fabrication, Inc.; U.S. District Court, Eastern District of Arkansas (Central), Expert Report, Deposition

Arm Ltd. v. Qualcomm, Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.
Documents and Other Information Considered

Schedule 2

ARM_		ARM_		ARM_		ARM_		ARM_		ARM_	
Begin	End	Begin	End	Begin	End	Begin	End	Begin	End	Begin	End
3	3	45266	45276	85679	85679	109791	109803	1228047	1228047	1236645	1236653
17	18	45334	45335	85680	85680	109806	109819	1228048	1228048	1236654	1236666
19	21	45393	45393	85682	85682	109822	109852	1228049	1228049	1236667	1236670
22	23	49072	49075	85687	85687	109855	109865	1228050	1228050	1236671	1236677
45	45	49139	49132	86088	86088	109982	109985	1228051	1228051	1236678	1236682
244	381	51071	51073	86164	86245	109991	109991	1228052	1228052	1236683	1236683
382	509	51088	51088	86247	86251	110165	110168	1228053	1228053	1236684	1236690
510	632	51378	51379	86285	86293	111064	111080	1228054	1228054	1236691	1236697
2166	2167	52468	52471	86829	86837	112064	112067	1228055	1228055	1236698	1236699
2198	2202	52794	52816	87367	87371	114880	114880	1228056	1228056	1236700	1236702
2226	2230	56424	56433	87449	87449	116328	116337	1228057	1228057	1236703	1236707
2280	2280	56439	56441	87451	87451	118835	118938	1228058	1228058	1236708	1236710
2953	2987	56519	56529	87699	87702	120302	120303	1228059	1228059	1236711	1236730
3621	3624	56538	56552	87854	87856	120530	120536	1228060	1228060	1236731	1236733
24810	24810	56882	56894	87936	87937	1215343	1215344	1228061	1228061	1236734	1236739
24815	24815	56900	56909	88045	88303	1215409	1215409	1228062	1228062	1236740	1236742
24817	24817	57152	57157	88371	88386	1215423	1215423	1228063	1228063	1236743	1236744
24819	24819	57479	57481	88390	88408	1215632	1215633	1228064	1228064	1237494	1237494
24820	24820	57594	57596	88655	88655	1215634	1215653	1228065	1228065	1237617	1237617
24825	24825	57594	57597	88656	88684	1215997	1216001	1228066	1228066	1238999	1239003
24826	24826	58159	58163	88892	88903	1226492	1226492	1228073	1228073	1239440	1239440
24837	24837	59363	59363	88906	88918	1226504	1226504	1228074	1228074	1239441	1239441
24838	24838	60458	60512	92674	92679	1226630	1226706	1228075	1228075	1239442	1239442
24841	24841	63607	63610	92784	92787	1228026	1228026	1228213	1228217	1239443	1239443
24844	24844	63692	63693	93852	93852	1228027	1228027	1231674	1231676	1239444	1239444
24851	24851	63694	63696	94543	94545	1228028	1228028	1232495	1232512	1239445	1239445
26001	26019	67288	67289	95370	95449	1228029	1228029	1232526	1232572	1239446	1239446
26092	26093	78754	78754	95578	95578	1228030	1228030	1232756	1232756	1239447	1239447
26471	26490	79507	79514	95579	95579	1228031	1228031	1233718	1233718	1239448	1239448
32604	32604	80910	80912	95580	95580	1228032	1228032	1235135	1235137	1239449	1239449
32650	32654	81942	81944	95789	95790	1228033	1228033	1235144	1235144	1239450	1239450
37458	37461	81945	81947	95791	95791	1228034	1228034	1235148	1235148	1239451	1239451
37462	37465	81962	81963	96011	96011	1228035	1228035	1235149	1235149	1239452	1239452
37713	37713	82268	82269	96692	96715	1228036	1228036	1236577	1236579	1239453	1239453
37718	37718	82426	82428	97388	97420	1228037	1228037	1236580	1236580	1239454	1239457
37729	37729	82714	82716	97512	97512	1228038	1228038	1236581	1236587	1239458	1239458
40078	40080	82717	82717	97522	97522	1228039	1228039	1236588	1236593	1239459	1239459
40237	40241	82717	82728	97527	97528	1228040	1228040	1236594	1236595	1239460	1239460
40283	40285	82871	82873	97966	97967	1228041	1228041	1236596	1236604	1239461	1239461
40289	40306	82874	82874	98968	99018	1228042	1228042	1236605	1236609	1239462	1239462
43894	43919	82925	82937	104678	104678	1228043	1228043	1236610	1236612	1239463	1239463
44650	44692	83252	83258	109518	109560	1228044	1228044	1236613	1236615	1239464	1239464
45250	45253	83356	83356	109734	109750	1228045	1228045	1236616	1236617	1239465	1239465
45262	45264	85677	85677	109778	109778	1228046	1228046	1236618	1236644	1239466	1239466

Arm Ltd. v. Qualcomm, Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.
Documents and Other Information Considered

Schedule 2

ARM_		ARM_		ARM_		ARM_		QCARM_		QCARM_	
Begin	End	Begin	End	Begin	End	Begin	End	Begin	End	Begin	End
1239467	1239469	1245599	1245617	1282466	1282575	1465116	1465121	591730	591732	3438153	3438193
1239470	1239470	1245618	1245618	1284005	1284007	<div>MASA_</div> <div>BeginEnd</div> 0000171900001724		591733	591736	3438194	3438234
1239471	1239471	1245619	1245640	1286878	1286998			591737	591740	3438235	3438275
1239472	1239472	1245641	1245672	1291148	1291148			591741	591745	3452409	3452442
1239473	1239473	1245673	1245703	1291202	1291202	<div>QCARM_</div> <div>BeginEnd</div> 28212823		592425	592431	3452662	3452664
1239474	1239474	1245704	1245705	1291691	1291745			2414807	2414813	3452665	3452667
1239475	1239475	1245706	1245719	1292638	1292644			2417783	2417783	3452668	3452672
1239476	1239476	1245720	1245726	1292866	1292866	2825	2827	2422682	2422711	3452720	3452723
1239477	1239477	1245727	1245755	1292867	1292914	20009	20010	2423231	2423233	3452805	3452807
1239478	1239478	1245756	1245793	1294035	1294036	275507	275543	2424464	2424466	3453808	3453810
1239479	1239479	1245794	1245813	1294037	1294038	275743	275763	2424496	2424498	3453866	3453868
1239483	1239483	1245814	1245837	1296809	1296825	276221	276248	2424621	2424623	3453870	3453872
1239485	1239485	1245838	1245848	1302854	1302857	276430	276430	2425046	2425048	3453873	3453874
1239486	1239486	1245849	1245890	1302909	1302912	276431	276441	2425297	2425299	3453875	3453877
1239488	1239488	1245891	1245914	1305265	1305265	276430	276430	2426801	2426803	3453879	3453881
1239490	1239490	1245915	1245938	1305375	1305375	315570	315583	2426804	2426806	3454302	3454304
1239493	1239493	1245939	1245940	1305479	1305479	332490	332490	2426807	2426814	3457104	3457104
1239495	1239495	1245941	1245978	1305515	1305515	337839	337855	2426815	2426821	3460229	3460233
1239504	1239504	1245979	1246020	1305785	1305789	337857	337899	2426822	2426836	3460451	3460453
1239789	1240096	1246021	1246042	1309668	1309669	338277	338284	2426837	2426852	3474751	3474828
1240202	1240203	1246043	1246066	1311070	1311084	338297	338311	2426853	2426855	3478016	3478018
1240204	1240225	1246067	1246085	1315342	1315364	338573	338576	2426856	2426881	3485446	3485461
1240226	1240236	1246086	1246111	1425186	1425186	338983	338989	2426882	2426882	3485462	3485541
1240237	1240280	1246112	1246134	1425194	1425198	339100	339127	2426883	2426884	3519910	3519912
1240281	1240282	1246135	1246157	1426109	1426156	339326	339335	2426885	2426887	3520810	3520812
1240283	1240304	1246158	1246194	1427450	1427492	340961	340961	2426888	2426888	3520813	3520815
1240305	1240307	1246195	1246197	1427493	1427522	341136	341178	2426889	2426891	3520816	3520818
1240308	1240325	1246198	1246224	1427523	1427537	342825	342841	2426892	2426894	3520819	3520821
1240326	1240353	1246225	1246227	1435422	1435423	343120	343142	2426895	2426897	3520822	3520825
1240354	1240381	1250306	1250306	1435455	1435456	343143	343222	2429058	2429059	3520826	3520829
1240382	1240391	1250307	1250307	1435466	1435466	343143	343222	2554114	2554116	3520830	3520834
1240392	1240412	1259704	1259704	1436707	1436716	343533	343587	3241389	3241393	3522610	3522611
1240413	1240437	1259705	1260105	1436796	1436801	343649	343650	3318368	3318368	3522895	3522902
1240438	1240447	1260121	1260391	1436919	1436946	343954	343976	3337797	3337799	3526546	3526553
1240448	1240448	1260418	1260686	1437116	1437117	350826	350848	3400486	3400548	3535535	3535535
1240449	1240469	1262030	1262366	1437128	1437128	351402	351483	3404294	3404353	3535536	3535536
1240470	1240507	1265340	1265342	1437135	1437136	352878	352906	3426632	3426638	3536628	3536629
1240508	1240526	1265728	1265733	1437178	1437179	356834	356845	3429791	3429872	3536886	3536888
1241187	1241187	1266931	1266990	1437214	1437216	363482	363482	3434164	3434165	3536889	3536891
1241589	1241589	1266995	1267070	1437222	1437233	550518	550529	3437962	3438003	3536892	3536894
1241597	1241598	1271909	1271926	1450767	1450768	557206	557207	3438004	3438037	3536895	3536897
1241616	1241620	1271927	1271928	1460538	1460538	569125	569164	3438038	3438074	3536898	3536901
1243410	1243629	1271929	1271953	1462242	1462255	569461	569494	3438075	3438113	3536902	3536905
1243875	1243995	1281879	1281879	1462325	1462360	584330	584332	3438114	3438152	3536921	3536933

Arm Ltd. v. Qualcomm, Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.
Documents and Other Information Considered

Schedule 2

QCARM_		QCARM_		QCARM_		QCARM_		QCARM_		QCARM_	
Begin	End	Begin	End	Begin	End	Begin	End	Begin	End	Begin	End
3537376	3537378	3682258	3682368	3859365	3859367	3919919	3919921	7434227	7434227	7627803	7627804
3537713	3537715	3819781	3819782	3862422	3862422	3920067	3920067	7434228	7434229	7629881	7629883
3537773	3537776	3819785	3819785	3862424	3862425	6920658	6920661	7471719	7471722	7634056	7634056
3616504	3616504	3819786	3819787	3880649	3880650	7389922	7389940	7497370	7497373	7635065	7635065
3626049	3626050	3839281	3839282	3912281	3912281	7389941	7389981	7497374	7497374	7646660	7646660
3674878	3674879	3839896	3839911	3912283	3912284	7427707	7427707	7505464	7505464		

Legal Documents and Related Exhibits

2022-08-31 - Complaint
2022-09-30 - Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Counterclaim
2022-10-26 - Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Amended Counterclaim
2022-11-15 - Plaintiff Arm Ltd.'s Answer and Affirmative Defenses to Defendant Qualcomm Inc., Qualcomm Technologies, Inc., and Nuvia, Inc.'s Amended Counterclaim
2023-02-27 - Arm Ltd.'s Objections and Responses to Qualcomm's First Set of Interrogatories, Nos. 1-11
2023-02-27 - Arm Ltd.'s Objections and Responses to Qualcomm's First Set of Requests for Production, Nos. 1-36
2023-02-27 - Defendants' Responses and Objections to Plaintiff's First Set of Interrogatories, Nos. 1-13
2023-02-27 - Defendants' Responses and Objections to Plaintiff's First Set of Requests for Production, Nos. 1-51
2023-04-04 - Arm Ltd.'s First Amended Objections and Responses to Qualcomm's First Set of Requests for Production, Nos. 1-36
2023-04-26 - Corrected Second Amended Complaint for Willful Patent Infringement
2023-05-04 - Defendants' Responses and Objections to Plaintiff's Second Set of Requests for Production, Nos. 52-58
2023-05-05 - Arm Ltd.'s First Objection and Responses to Qualcomm's Second Set of Requests for Production, Nos 37-50
2023-06-23 - Defendants' First Supplemental Responses and Objections to Plaintiff's First Set of Interrogatories, Nos. 1-4 and 6
2023-07-14 - Arm Ltd.'s First Objection and Responses to Qualcomm's Third Set of Requests for Production, Nos. 51-54
2023-08-23 - Defendants' Responses and Objections to Plaintiff's Third Set of Requests for Production, Nos. 59-122
2023-10-02 - Arm Ltd.'s Objections and Responses to Qualcomm's Second Set of Interrogatories, Nos. 12-19
2023-10-02 - Plaintiff Arm Ltd.'s Objections and Responses to Defendant Qualcomm's Fourth Set of Requests for Production, Nos. 55-70
2023-10-20 - Defendants' Responses and Objections to Plaintiff's First Set of Requests for Admission, Nos. 1-30
2023-10-26 - Defendants' Supplemental and Amended Response and Objections to Plaintiff's First Set of Interrogatories, No. 5
2023-10-26 - Correspondence Email from J. Braly to J. Li
2023-10-27 - Defendants' Responses and Objections to Plaintiff's Second Set of Interrogatories
2023-11-09 - Arm Ltd.'s Objections and Responses to Qualcomm's Third Set of Interrogatories, No. 20
2023-11-17 - Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Second Set of Interrogatories, Nos. 12-19
2023-11-17 - Arm Ltd.'s Objections and Responses to Qualcomm's Fourth Set of Interrogatories, Nos. 21-25
2023-11-17 - Arm Ltd.'s Second Supplemental Objections and Responses to Qualcomm's First Set of Interrogatories, Nos. 1-11
2023-11-17 - Arm Ltd.'s Supplemental Objections and Responses to Qualcomm's Third Set of Interrogatories, No. 20
2023-11-17 - Defendants' First Supplemental Reponses and Objections to Plaintiff's Second Set of Interrogatories, Nos. 15-16
2023-11-17 - Defendants' Responses and Objections to Plaintiff's Fourth Set of Requests for Production, No. 123
2023-11-17 - Plaintiff Arm Ltd.'s Objection and Responses to Defendant Qualcomm's Fifth Set of Requests for Production, Nos. 71-124
2023-11-17 - Plaintiff Arm Ltd.'s Responses and Objections to Qualcomm's First Requests for Admissions to Plaintiff, Nos. 1-30
2024-02-12 - Plaintiff Arm Ltd.'s Objections and Responses to Qualcomm's Sixth Set of Requests for Production (Nos. 125-147)
2024-03-13 - Defendant's Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Second Amended Counterclaims
2024-04-29 - Arm Ltd.'s Objections and Responses to Qualcomm's Fifth Set of Interrogatories (Nos. 26-28)
2024-05-02 - Arm Ltd.'s Responses and Objections to Qualcomm's Seventh Set of Requests for Production (Nos. 148-154)
2024-05-07 - Defendant's Responses and Objections to Plaintiff's Third Set of Interrogatories (Nos. 26-29)
2024-05-10 - Arm Ltd.'s Objections and Responses to Qualcomm's Sixth Set of Interrogatories (No. 29)
2024-05-10 - Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Fifth Set of Interrogatories (Nos. 26-28)

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Documents and Other Information Considered

Schedule 2

Deposition Transcripts and Related Exhibits			
2023-09-22 - Rohit Singh	2023-11-03 - Gerard Williams	2023-11-29 - Lynn Bos	2023-12-14 - Laura Sand
2023-10-12 - Manu Gulati	2023-11-08 - Ziad Asghar	2023-11-30 - Karthik Shivashankar	2023-12-19 - Christine Tran
2023-10-20 - Ramakrishna Chunduru	2023-11-09 - Paul Williamson	2023-12-01 - Pradeep Kanapathipillai	2023-12-20 - Ian Thornton
2023-10-25 - Jignesh Trivedi	2023-11-15 - Christiano Amon	2023-12-07 - Mark Werkheiser	2024-05-10 - Guy Larri
2023-10-25 - Tim Herbert	2023-11-15 - Richard Grisenthwaite	2023-12-08 - Geeta Balakrishnan	2024-05-16 - Geetha Vedaraman
2023-10-27 - Nitin Sharma	2023-11-16 - Simon Segars	2023-12-08 - Jonathan Armstrong	
2023-10-27 - Will Abbey	2023-11-28 - Jim Thompson	2023-12-12 - Rene Haas	
2023-11-02 - Lynn Couillard	2023-11-28 - Michael Roberts	2023-12-14 - Vivek Agrawal	

Expert Reports
2024-02-27 - Expert Report of Patrick F. Kennedy, PhD.
2024-05-20 - Opening Expert Report of Dr. Murali Annavaram Regarding Qualcomm's Counterclaim
2024-05-20 - Expert Report of Patrick F. Kennedy, Ph.D.
2024-06-10 - Rebuttal Expert Report of Dr. Robert P. Colwell to Dr. Annavaram's Opening Expert Report Regarding Qualcomm's Counterclaim

Publicly Available Information/Other
Ampere’s Second Mot. for Protective Order
Arm Holdings plc Amendment No. 2 to Form F-1, September 5, 2023
Arm Holdings plc Form 424(b)(4), September 14, 2023
Arm Holdings plc FQ2 2024 Earnings Call Transcripts, November 8, 2023
Arm Holdings plc FQ3 2024 Earnings Call Transcripts, February 7, 2024
Arm Holdings plc FQ3 2024 Results Presentation, February 7, 2024
Arm Holdings plc Q2 FY 2024 Key Financial Data
Arm Holdings plc Q2 FY 2024 Shareholder Letter
Arm Holdings plc Q3 FY 2024 Key Financial Data
Arm Holdings plc Q3 FY 2024 Shareholder Letter
Arm Neoverse CMN-700 Coherent Mesh Network, Technical Reference Manual, Revision: r3p2, p. 17.
Bhandarkar, Dileep, and Douglas W. Clark. "Performance from architecture: comparing a RISC and a CISC with similar hardware organization." Proceedings of the fourth international conference on Architectural support for programming languages and operating systems. 1991
Hearing Transcript, September 29, 2023
https://9to5mac.com/2019/11/15/three-former-apple-execs-create-new-chip-company-will-compete-with-intel-and-amd/
https://aws.amazon.com/what-is/cpu/
https://community.fs.com/article/what-is-a-server-cpu.html
https://download.intel.com/newsroom/kits/40thanniversary/pdfs/What_is_a_Microprocessor.pdf
https://futurumgroup.com/about-us/who-we-are/
https://futurumgroup.com/insights/qualcomm-snapdragon-x-elite-and-█cpu-aim-to-disrupt-the-pc-market/
https://hbr.org/2022/08/in-uncertain-times-the-best-strategy-is-adaptability
https://investor.qualcomm.com/segments/qct
https://investors.arm.com/static-files/187d293b-42eb-48b0-b82f-e78bce4da9e4
https://medium.com/silicon-reimagined/performance-delivered-a-new-way-8f0f5ed283d5
https://mixed-news.com/en/samsung-xr-devices-will-use-google-and-qualcomm-tech/
https://newsroom.arm.com/news/arm-announces-closing-of-initial-public-offering
https://nvidianews.nvidia.com/news/nvidia-introduces-grace-cpu-superchip
https://pc-tablet.com/qualcomm-throws-down-the-gauntlet-snapdragon-xr2-gen-2-challenges-apples-vision-pro-in-mixed-reality-race/
https://podcasts.apple.com/us/podcast/qualcomm-ceo-on-what-he-really-thinks-of-apple/id1091374076?i=1000565773375
https://seekingalpha.com/article/4422252-qualcomm-incorporateds-qcom-ceo-steve-mollenkopf-on-q2-2021-results-earnings-call-transcript
https://semiengineering.com/knowledge_centers/integrated-circuit/ic-types/processors/central-processing-unit-cpu/

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Documents and Other Information Considered

Schedule 2

Publicly Available Information/Other (cont.)
https://support.microsoft.com/en-us/windows/common-pc-and-device-terms-4542f069-4cf7-431a-bb6b-c6cbdbe3e6e9
https://techcrunch.com/2020/09/24/nuvia-series-b
https://viewpoint.pwc.com/dt/us/en/pwc/pwc_sec_volume/pwc_sec_volume_US/8000_registration_an_US/sec_8110_form_f1_US.html#pwc-topic.dita_fb3ce65d-0b9d-4db7-92ff-4e1fd99ba885
https://web.archive.org/web/20210115193713/https://nuviainc.com/
https://web.archive.org/web/20210316180114/https://nuviainc.com/
https://web.archive.org/web/20210422062904/https://nuviainc.com/nuvia-raises-53-million-to-reimagine-silicon-design-for-the-data-center/
https://www.americanbar.org/groups/tort_trial_insurance_practice/committees/automobile-litigation/safety_regulatory_considerations/
https://www.androidauthority.com/mobile-processors-2022-2741344/
https://www.arm.com/architecture/cpu
https://www.arm.com/glossary/adas
https://www.arm.com/glossary/connected-devices
https://www.arm.com/glossary/cpu
https://www.arm.com/glossary/iot-devices
https://www.arm.com/glossary/isa
https://www.arm.com/glossary/risc
https://www.arm.com/glossary/smart-devices
https://www.arm.com/glossary/soc-development
https://www.arm.com/partners
https://www.arm.com/products/silicon-ip-system/corelink-interconnect/cmn-700
https://www.cnbc.com/2022/09/01/why-arms-lawsuit-against-qualcomm-is-a-big-deal.html
https://www.cnbc.com/2023/09/14/arm-ipo-what-is-risc-v-and-why-does-arm-call-the-rival-product-a-risk.html
https://www.cnbc.com/2023/11/09/how-arm-gained-chip-dominance-with-apple-nvidia-amazon-and-qualcomm.html
https://www.cnet.com/tech/computing/qualcomms-pc-chip-could-mean-windows-pcs-as-good-as-apple-macbooks/
https://www.currency.me.uk/convert/gbp/usd
https://www.digitaltrends.com/computing/what-is-a-cpu/
https://www.eweek.com/servers/cavium-introduces-thunderx2-arm-server-chip-for-data-center-systems/
https://www.forbes.com/sites/jonmarkman/2023/12/05/qualcomms-x-elite-crushes-apple-arm-holdings-stocks-surge/?sh=5f330d9e7d04
https://www.forbes.com/sites/startswithabang/2018/02/13/chaos-theory-the-butterfly-effect-and-the-computer-glitch-that-started-it-all/?sh=4b460bee69f6
https://www.ftc.gov/system/files/documents/cases/d09404_part_3_complaint_public_version.pdf
https://www.gigabyte.com/Article/server-processors-the-core-of-a-server-s-performance
https://www.gigabyte.com/Glossary/cisc
https://www.globenewswire.com/news-release/2019/11/15/1948072/0/en/NUVIA-Raises-53-Million-to-Reimagine-Silicon-Design-for-the-Data-Center.html
https://www.intel.com/content/www/us/en/newsroom/resources/moores-law.html
https://www.intel.com/content/www/us/en/products/docs/processors/xeon/server-processor-overview.html
https://www.intel.com/content/www/us/en/support/articles/000056236/intel-nuc.html
https://www.investopedia.com/articles/markets/012216/worlds-top-10-semiconductor-companies-tsmintc.asp
https://www.lenovo.com/us/en/glossary/cpu-core/
https://www.lenovo.com/us/en/glossary/instruction-set-architecture/
https://www.lenovo.com/us/en/glossary/x86/
https://www.linkedin.com/in/ivan-knez/
https://www.linkedin.com/in/peter-greenhalgh-8900789b/
https://www.linkedin.com/in/shultzwang/
https://www.linkedin.com/in/todd-lepinski-ababaa9/
https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-the-internet-of-things
https://www.pcmag.com/news/qualcomm-snapdragon-x-elite- chip-tests
https://www.pcworld.com/article/1382740/qualcomm-dubs-nuvia-cpu- on-track-for-2023.html
https://www.precedenceresearch.com/microprocessor-market
https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/M29QualcommPDFa.pdf
https://www.qualcomm.com/news/onq/2022/11/qualcomm- custom-cpu-at-center-of-next-gen-premium-experiences-on-snapdragon-platforms
https://www.qualcomm.com/news/releases/2005/11/qualcomm-introduces-worlds-most-advanced-mobile-microprocessor

Arm Ltd. v. Qualcomm, Inc., Qualcomm Technologies, Inc. and Nuvia, Inc.
Documents and Other Information Considered

Schedule 2

Publicly Available Information/Other (cont.)
https://www.qualcomm.com/news/releases/2021/01/qualcomm-acquire-nuvia
https://www.qualcomm.com/news/releases/2021/03/qualcomm-completes-acquisition-nuvia
https://www.qualcomm.com/news/releases/2023/10/qualcomm-unleashes-snapdragon-x-elite--the-ai-super-charged-plat
https://www.qualcomm.com/products
https://www.qualcomm.com/products/technology/processors
https://www.qualcomm.com/research/extended-reality
https://www.qualcomm.com/snapdragon/overview
https://www.sec.gov/files/reada10k.pdf
https://www.techspot.com/article/1856-aiming-for-atoms-chip-manufacturing/
https://www.telink-semi.com/system-on-chip/
https://www.tomshardware.com/news/arm-based-cpus-set-to-double-notebook-pc-market-share-by-2027
https://www.tomshardware.com/pc-components/cpus/arm-pc-market-share-shrinks-mercury-research
https://www.tomshardware.com/reviews/glossary-soc-system-on-chip-definition,5890.html
https://www.wired.com/story/apples-new-macbook-pro-chips-flex-power-custom-silicon/
NuVia, Inc., Private Company Profile, S&P Capital IQ
Nvidia-Arm, A report to the Secretary of State for Digital, Culture, Media & Sport on the anticipated acquisition by NVIDIA Corporation of Arm Limited, July 20, 2021
Performance from Architecture: Comparing a RISC and a CICS with Similar Hardware Organization, Bhandarkar & Clark
Qualcomm Inc. Form 10-K for the fiscal year ended September 24, 2023
Qualcomm Inc. Form 10-K for the fiscal year ended September 26, 2021
Qualcomm Incorporated FQ1 2024 Earnings Call Transcripts, January 31, 2024
Qualcomm Incorporated, Form 10-K for fiscal year ended September 24, 2023
Reference Manual on Scientific Evidence, Federal Judicial Center and National Research Council of the National Academies
S&P Capital IQ, Infineon Technologies AG Transaction Details, Merger/Acquisition: Cypress Semiconductor Corporation
S&P Capital IQ, Nuvia, Inc. Transaction Details, Merger/Acquisition: Qualcomm Technologies, Inc.
S&P Capital IQ, Nuvia, Inc. Transaction Details, Private Placement: Mayfield Fund, LLC
The Sedona Conference, Commentary on Monetary Remedies in Trade Secret Litigation, 24 SEDONA CONF. J. 349 (2023)
Weil, Roman L., et al. Litigation Services Handbook: The Role of the Financial Expert, 6th Edition, Wiley, 2017

Exhibit 17

HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY

**UNITED STATES DISTRICT COURT
DISTRICT OF DELAWARE**

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	:	
ARM LTD., a U.K. corporation,	:	
	:	
Plaintiff,	:	
	:	Civil Action No.
v.	:	1:22-cv-01146
	:	
QUALCOMM INC., a Delaware	:	
corporation, QUALCOMM	:	
TECHNOLOGIES INC., a Delaware	:	
corporation, and NUVIA, INC., a	:	
Delaware corporation,	:	
	:	
Defendants.	:	
	:	
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EXPERT REPLY REPORT OF PROFESSOR GUHAN SUBRAMANIAN

MARCH 25, 2024

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I. BACKGROUND

A. Qualifications

1. I serve as the H. Douglas Weaver Professor of Business Law at the Harvard Business School (“HBS”) and the Joseph Flom Professor of Law and Business at the Harvard Law School (“HLS”). I hold degrees in Economics, Law, and Business from Harvard University. On December 20, 2023, I submitted an expert report in the above-captioned matter (the “Original Report”).¹ My background, qualifications, and compensation are set forth in my Original Report, and my Curriculum Vitae, which includes a complete listing of my academic publications and expert witness testimony over the past five years, is attached as **Appendix A** of the Original Report.²
2. Since filing the Original Report, I have reviewed the reports submitted by Professor John Coates and Dr. Patrick Kennedy on behalf of Qualcomm and Nuvia.³ I have been asked by counsel for Arm, Morrison & Foerster LLP, to

¹ Capitalized terms used herein, but not otherwise defined, have the meanings assigned to them in my Original Report.

² Since filing the Original Report I was deposed in *Sjunde Ap-Fonden v. The Goldman Sachs Group, Inc. et al.* (S.D.N.Y. No. 18-cv-12084) (2024). I also have two new forthcoming papers: ESG Amnesia in M&A Deals, *Journal of Corporation Law* (forthcoming 2025) (with Caley Petrucci); and Redemption Mechanisms in Poison Pills: Evidence on Pill Design and Law Firm Effects, *The Business Lawyer* (forthcoming 2025) (with Olivier Baum).

³ Expert Rebuttal Report of Prof. John Coates. *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.* (D. Del. No. 1:22-cv-01146) (Feb. 27, 2024) (“Coates Report”); Expert Report of Patrick F. Kennedy, Ph.D. *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.* (D. Del. No. 1:22-cv-01146) (Feb. 27, 2024) (“Kennedy Report”).

assess the arguments and claims of Professor Coates and Dr. Kennedy as they relate to the opinions I put forth and the topics discussed in my Original Report. Nothing contained in those reports causes me to reconsider or change any of the conclusions that I reached in the Original Report, and I affirm those conclusions in this reply report (the “Reply Report”).

3. A complete list of the documents and data that I rely upon in reaching my conclusions in this matter is provided in **Appendix A: *Materials Considered***.
4. I hold the opinions stated in this report with a reasonable degree of professional certainty. I reserve the right to amend or supplement my opinions and report, if appropriate, based on any additional discovery, or in response to opinions or reports of other experts in this matter.

B. Summary of Opinions

5. Based on my review of the Coates Report and the Kennedy Report, I conclude that:
 - Professor Coates’ claim that “Arm’s ALAs could very well cover identical technology” is irrelevant.
 - Because the negotiated agreements provided distinct, different rights, Professor Coates is incorrect that Qualcomm did not need to negotiate with Arm following the Nuvia acquisition.
 - Professor Coates’ distinction between change of control provisions and anti-assignment provisions is wrong, illusory, and incoherent.

- Professor Coates does not dispute that the plain language of the Nuvia ALA requires discontinuance of use of Arm Technology and Arm Confidential Information and its return or destruction. Contrary to Professor Coates’ assertion, this would include Nuvia technology considered “proprietary” so long as it embodies Arm Technology and Arm Confidential Information.
- Professor Coates’ own examples and Dr. Kennedy’s failure to quantify damages demonstrate why damages here could not be calculated with reasonable certainty.

6. I explain these conclusions in the remainder of this report.⁴

II. PROFESSOR COATES’ CLAIM THAT “ARM’S ALAs COULD VERY WELL COVER IDENTICAL TECHNOLOGY” IS IRRELEVANT.

7. In the Original Report, I observed that Arm negotiated different ALAs with Qualcomm and Nuvia. I provided examples of the differences between the Qualcomm and Nuvia ALAs, including [REDACTED] [REDACTED]⁵ I concluded that “[t]he uniqueness of these contracts, as well as their individualized provisions, indicates that each was the product of negotiations between the parties and Arm, and as such, each reflects the deliberate intentions and expectations of Qualcomm or Nuvia, respectively.”⁶

⁴ The opinions described herein are not exhaustive of all the errors and incorrect assertions Professor Coates makes in his report.

⁵ Original Report at Table 1.

⁶ *Id.* ¶ 63.

8. Professor Coates does not challenge this straightforward conclusion. Instead, he engages in an effort to distract:

Professor Subramanian ... reviewed nine of ARM's at least 17 ALAs with parties other than Qualcomm and NUVIA that are listed on ARM's ALA redaction log. It is not clear why Professor Subramanian chose not to review *all* ARM's ALAs or how he selected the ALAs he reviewed.⁷

9. According to Professor Coates, this alleged "review of incomplete and redacted contracts ... precludes Professor Subramanian from offering any reliable assessment as to the degree of individualization in ARM ALAs at large."⁸
10. Professor Coates apparently misunderstands the purpose of my review. These nine additional ALAs are documents that I "[c]onsidered" in my analysis.⁹ I found that these ALAs were instructive examples of how [REDACTED] [REDACTED] provisions, as well as [REDACTED] provisions requiring [REDACTED], were commonplace in Arm's negotiated ALAs.¹⁰ I did not make any claims in my Original Report about how these nine additional ALAs may have been negotiated or whether they covered identical or different technology, and they

⁷ Coates Report ¶ 82 (emphasis in original).

⁸ *Id.* ¶ 83.

⁹ See Original Report at Appendix B ("Materials Considered").

¹⁰ See *Id.* ¶¶ 67-69, 71.

are not relevant for my conclusion that the Qualcomm and Nuvia ALAs each were “the product of negotiations ... and as such, each reflects the deliberate intentions and expectations of Qualcomm or Nuvia, respectively.”¹¹ This conclusion is consistent with the evidentiary record regarding the negotiation of the Qualcomm ALA in 2013 and the later negotiation of the Nuvia ALA in 2019.¹² Professor Coates’ attempt to attack my methodology is nothing more than an effort to distract from this straightforward conclusion.¹³

11. Notably, Professor Coates does not identify a single ALA that challenges or contradicts my analysis, i.e., that demonstrates a lack of individualization in Arm’s ALAs. Presumably, if Professor Coates had reviewed Arm’s ALAs and found some to be indistinguishable, he would have put this forward in his arguments. His inability to cite *any* contract that lacks “highly individualized terms”¹⁴ is a glaring omission in his analysis.

¹¹ *Id.* ¶ 63.

¹² I discuss documents and testimony relating to the unique negotiation considerations of the Nuvia and Qualcomm ALAs in my Original Report. *See id.* ¶¶ 27-29, 63-65.

¹³ Professor Coates also notes that the Annex 1 is redacted in these nine other agreements, suggesting—without basis—that the information in those redactions might have affected my analysis. He states: “My understanding from counsel is that ARM has not produced unredacted versions of these contracts. Because I have not been able to review these provisions, I am unable to evaluate how the redacted provisions would affect Professor Subramanian’s analysis of ARM’s ALAs or other issues in his report.” Coates Report ¶ 82. I can answer Professor Coates’ question: the redacted provisions of the other ALAs have nothing to do with my conclusion that the Qualcomm and Nuvia ALAs were the product of negotiations and business objectives of Qualcomm or Nuvia, respectively.

¹⁴ *See* Coates Report ¶ 80.

12. Professor Coates ignores the discussion in my Original Report that Arm’s ALAs limit the license to the Arm Technology delivered by Arm to the licensee under that *particular* license.¹⁵ An ALA licensee is licensed only to what is delivered by Arm under that contract to that licensee, but Professor Coates assumes that an ALA provides some level of a generic license to Arm Technology, which is inconsistent with the relevant deposition testimony from Arm personnel.¹⁶
13. The fact that the Qualcomm and Nuvia ALAs are different confirms that they cover different implementations of Arm technology, as set forth in my Original Report.¹⁷ This conclusion is further supported by the fact that they have

¹⁵ Original Report ¶ 83.

¹⁶ See, e.g., Abbey, Will. Deposition (Oct. 27, 2023) (“Abbey Dep.”) 144:6-145:2 (“[W]hat I do know is that you can’t transfer designs that are created under one A- -- ALA to a -- another company under another ALA. I don’t know what I would have thought back in 2021, but what I know for a fact is that that’s not something that we would support.”); Segars, Simon. Deposition (“Segars Dep.”) (Nov. 16, 2023) 100:5-8 (“And, you know, at a high level, Arm’s licenses allow licensees to take what we give them, build a chip, manufacture that chip, sell it to a customer, and not give their designs to somebody else.”); Williamson, Paul. Deposition (“Williamson Dep.”) (Nov. 9, 2023) 73:4-11 (“So it was my understanding and it is reiterated here that the Nuvia ALA requires ARM consent for transfer.”); Haas, Rene. Deposition (Dec. 12, 2023) (“Haas Dep.”) 99:23-100:15 (“I think from a broad standpoint, the -- the way to think about it is that the license rights are assigned to an entity and to a company. And for those rights to go just gratis over into another acquiring company could potentially be interpreted as a loss of revenue for us or loss of long-term revenue. So it’s fairly common practice in the industry for this to happen.”).

¹⁷ Original Report ¶¶ 58-66.

different economic terms for those implementations.¹⁸ Nevertheless, Professor Coates speculates that “ARM’s ALAs could very well cover identical technology.”¹⁹ In light of the significant differences of the rights granted between the Nuvia and Qualcomm ALAs, his speculation that the ALAs “could very well cover identical technology” has the same logical structure as the possibility that I “could very well” write songs like Taylor Swift.²⁰

14. Even if one were to accept Professor Coates’ speculation that the Nuvia and Qualcomm ALAs “cover[ed] identical technology,” that does not mean that the licenses for the (allegedly) identical technology were at the same prices, or provided the same rights. On the contrary, the pricing was different between

¹⁸ See Annex 1 to the Architecture License Agreement Between Arm Limited and NuVia, Inc (Mar. 27, 2020) (ARM_00057230 at ARM_00057240) (“NuVia ALA Annex 1”) (showing a royalty rate of \$0.50-\$0.75 per CPU); Master Royalty Schedule Between Qualcomm Global Trading Pte, Ltd. and Arm Limited (May 30, 2013) (LES-LTM-20780) (ARM_01298891 at ARM_01298894-900) (showing a royalty rate of \$0.06-\$0.09 per CPU, or a percentage-based royalty).

¹⁹ Coates Report ¶ 87. *See also id.* ¶ 89 (“While they are not identical agreements, Professor Subramanian fails to acknowledge that parts of the agreements, including certain of the licensed technology, are the same, and therefore that ARM’s intentions and expectations, which presumably include an intention to allow licensee use of the licensed technology, are, at least in part, the same in both agreements.”). This is an inconsequential observation that can be reduced to the tautological fact that both ALAs are, by definition, agreements for the licensee to use Arm architecture technologies; this does not imply that these ALAs or any ALAs are interchangeable.

²⁰ A similar flaw undermines Professor Coates’ claim that the case studies cited in my Original Report are inapplicable to my conclusion that the termination provisions in the Nuvia ALA are necessary to effectuate the CIC provisions. *Id.* ¶¶ 135-38. Professor Coates relies on mischaracterizations such as his misguided argument that the Qualcomm and Nuvia ALAs might cover identical technology in his attempt to distinguish these case studies. As I discussed in my Original Report, the case studies discussed in my original report remain applicable.

the two ALAs: Nuvia paid [REDACTED] over [REDACTED] years, while Qualcomm paid [REDACTED] over [REDACTED] years.²¹ Further, Nuvia's royalty rate was between [REDACTED] per CPU, while Qualcomm's royalty rate was between [REDACTED] per CPU, or [REDACTED].²² This simple fact renders Professor Coates' claim that the ALAs could cover identical technology irrelevant, because the royalty rates for this allegedly "identical technology" were different, as were the relevant rights.

15. Differences in core contract terms like royalties reflect different negotiated deals between each of the parties, which would not be interchangeable in terms of business objectives. Negotiation theory posits that such differences would have resulted from the different scope of each collaboration, the different starting negotiating postures (including the [REDACTED]) and bargaining power of Nuvia and Qualcomm, respectively, and/or trades across other issues that Nuvia or Qualcomm made with Arm to arrive at the final unique mix of contract terms.²³

²¹ Original Report ¶ 62.

²² *Id.*

²³ See, e.g., Klausner, Michael and Guhan Subramanian. *Deals: The Economic Structure of Business Transactions*. Page Proofs. Harvard University Press, forthcoming ("Deals") at 9-10, 15 (ARM_01431858 at ARM_01431876-77, ARM_01431882). Professor Coates alleges that this analysis is meant to "supply the meaning of contracts after they have been agreed to by parties" Coates Report ¶ 76, and that I "tr[y] to use principles of negotiation theory and

16. Moreover, even if the Nuvia and Qualcomm ALAs “cover[ed] identical technology” at some level of abstraction, notwithstanding the different lists of deliverables and timing of delivery,²⁴ the plain words in the contracts gave Qualcomm and Nuvia the right to use only the Arm technology delivered under each party’s respective ALA.²⁵ Most relevant for present purposes, the Nuvia ALA did not give Qualcomm or any other third parties the right to use [REDACTED]

[REDACTED]

[REDACTED] or [REDACTED]

[REDACTED]

[REDACTED] contained in Nuvia products following a change of control, nor did the Qualcomm ALA give Qualcomm the right to use [REDACTED]

transactional practice to interpret a contract in a way that would usurp the role of the court to interpret the contract” and opine on “the intentions of the parties[.]” Coates Report ¶ 19. These claims are wrong. My usage of the principles of negotiation theory and transactional practice is not meant to interpret the Nuvia or Qualcomm ALAs in any legal sense, but rather to analyze the business objectives and negotiations that led to the plain language of the contract provisions and, from that perspective, analyze the reasons why certain IP protections would have been in place for the parties.

²⁴ See Annex 1 to the Architecture License Agreement Between Arm Limited and Qualcomm Global Trading Pte, Ltd. (May 29, 2013) (ARM_00063298 at ARM_00063299-300) (“Qualcomm 2013 ALA Annex 1”); Nuvia ALA Annex 1 at ARM_00057231-32 (both, listing deliverables from Arm).

²⁵ See Qualcomm 2013 ALA Annex 1 at ARM_00063301 (defining “Architecture Compliant Core” as “a microprocessor core developed by or for LICENSEE under the licenses granted in this Annex 1”); Nuvia ALA Annex 1 at ARM_00057233 (defining “Architecture Compliant Core” as “a microprocessor core developed by LICENSEE under the licenses granted in this Annex 1”); Original Report ¶ 83.

²⁶ This means that even if the ALAs “could very well cover identical technology,” as Professor Coates claims, the plain language of the contract states that [REDACTED]

These conclusions are consistent with the relevant deposition testimony.²⁷ Professor Coates fails to acknowledge that, as set forth in my Original Report, Arm's ALAs [REDACTED]

[REDACTED]²⁸ For this reason, Professor Coates’ suggestion
that the ALAs “cover[ed] identical technology” is irrelevant.

17. Professor Coates blurs the important distinction between the intellectual property (“IP”) covered under the contracts and Arm’s instruction set

²⁶ Technology License Agreement (“ALA”) Between Arm Limited and NuVia, Inc. (Sept. 27, 2019) (ARM_00059183 at ARM_00059196-97) (“Nuvia ALA”) (quoted in Coates Report ¶ 125).

27 See, e.g., Segars Dep. 100:5-8 (“And, you know, at a high level, Arm’s licenses allow licensees to take what we give them, build a chip, manufacture that chip, sell it to a customer, and not give their designs to somebody else.”); Abbey Dep. 144:6-145:2 (“[W]hat I do know is that you can’t transfer designs that are created under one A -- ALA to a -- another company under another ALA.”); Williamson Dep. 73:4-11 (“So it was my understanding and it is reiterated here that the Nuvia ALA requires ARM consent for transfer.”); Haas Dep. 99:23-100:15 (“I think from a broad standpoint, the -- the way to think about it is that the license rights are assigned to an entity and to a company. And for those rights to go just gratis over into another acquiring company could potentially be interpreted as a loss of revenue for us or loss of long-term revenue. So it’s fairly common practice in the industry for this to happen.”).

²⁸ Original Report ¶ 83.

architecture (“ISA”), one component of that IP.²⁹ While Professor Coates observes that both the Nuvia and Qualcomm ALAs granted a license to develop CPUs compliant with Arm’s v8 ISA,³⁰ this observation is not informative as to the parties’ rights under their respective licenses. To see the point, I highly doubt that, prior to Qualcomm’s acquisition of Nuvia, Professor Coates would have claimed that Qualcomm had a right to use Nuvia’s Arm-compliant designs, simply because [REDACTED] e. Knowing that the two ALAs [REDACTED], Professor Coates has no basis to assume that the Nuvia ALA contained nothing of value to assign to Qualcomm, let alone did not require assignment.³¹

18. Finally, Professor Coates’ claim that the ALAs “could very well cover identical technology” is flatly contradicted by the actions of the parties. Professor Coates provides a detailed account of the negotiations between Qualcomm and Arm over the Nuvia ALA following Qualcomm’s acquisition of Nuvia.³² None of

²⁹ See, e.g., Coates Report ¶¶ 88-89.

³⁰ *Id.* ¶ 37.

³¹ See *id.* ¶¶ 88-89, 94, 117 (“Professor Subramanian does not consider that the Qualcomm ALA granted rights associated with the same technology”; “I do not find Qualcomm’s communications with ARM around the time of the NUVIA acquisition to be an acknowledgement by Qualcomm that assignment of the NUVIA ALA was necessary in order for Qualcomm to continue developing NUVIA technology.”; “Qualcomm’s existing ALA with ARM meant that Qualcomm did not need to ‘gain access to licensed technology by acquiring’ NUVIA.”).

³² *Id.* ¶¶ 52-67.

these negotiations would be necessary if the ALAs “cover[ed] identical technology” (they did not), [REDACTED]

[REDACTED] I now examine this negotiation between Qualcomm and Arm in more detail.

III. BECAUSE THE NEGOTIATED AGREEMENTS PROVIDED DISTINCT, DIFFERENT RIGHTS, PROFESSOR COATES IS INCORRECT THAT QUALCOMM DID NOT NEED TO NEGOTIATE WITH ARM FOLLOWING THE NUVIA ACQUISITION.

19. As set forth in my Original Report, [REDACTED]

[REDACTED] ■ [REDACTED]

[REDACTED] As a result of these factors, Qualcomm and Arm negotiated at length over possible terms that would have permitted Qualcomm to continue using the Arm technology in Nuvia applications.³⁵

20. Professor Coates provides an extensive account of these negotiations in his report.³⁶ He tries to obfuscate the situation by describing the fact that

³³ Original Report ¶¶ 58-66.

³⁴ *Id.*

³⁵ *Id.* ¶¶ 70-76.

³⁶ Coates Report ¶¶ 52-67.

“Qualcomm and ARM continued to communicate,” there was “communication” between the parties, that Qualcomm had “communications with ARM around the time of the NUVIA acquisition,” and that “conversations between the parties did not advance,” but he eventually concedes that these “communications” and “conversations” were in fact “[n]egotiations.”³⁷ The fact that Qualcomm perceived the need to negotiate with Arm directly contradicts Professor Coates’ suggestion that the ALAs provided the same rights to the same technology.

21. Professor Coates also asserts that “Qualcomm’s existing ALA with ARM meant that Qualcomm did not need to ‘[REDACTED]’³⁸ If Professor Coates is simply claiming that Qualcomm did not need to acquire Nuvia, then I agree; nothing required Qualcomm to acquire Nuvia. However, if Professor Coates is claiming that, because (in his opinion) “ARM’s ALAs could very well cover identical technology,”³⁹ that Qualcomm could use the Arm technology in Nuvia products without Arm’s approval, that is a stunning and unsupported claim. It contains no analysis of the contracts or the businesses; it requires technical expertise that Professor

³⁷ See *id.* ¶¶ 54, 56, 63, 67, 94.

³⁸ *Id.* ¶ 117.

³⁹ *Id.* ¶ 87.

Coates does not claim to have; and it is directly contradicted by the contractual terms that Professor Coates cites in his report and the deposition testimony from the relevant Arm personnel.⁴⁰

22. The idea that Qualcomm did not need to negotiate with Arm is also directly contradicted by the contemporaneous statements of the parties. I summarized some of these statements in my Original Report.⁴¹ For example, [REDACTED], stated in one email that [REDACTED]
[REDACTED], [REDACTED]
[REDACTED]⁴² [REDACTED] also stated in another email that [REDACTED]
[REDACTED]
[REDACTED] [REDACTED] [REDACTED]
[REDACTED] further testified that [REDACTED]
[REDACTED]⁴⁴ Professor Coates ignores this overwhelming evidence of the need to negotiate—from Nuvia itself—that directly contradicts

⁴⁰ See, e.g., Segars Dep. 100:5-8; Abbey Dep. 144:6-145:2; Williamson Dep. 73:4-11; Haas Dep. 99:23-100:15.

⁴¹ Original Report ¶¶ 72-76.

⁴² Email from Gerard Williams III to Lip-Bu Tan, *ARM latest* (June 19, 2019) (QCARM_0020011) (emphasis added).

⁴³ Email from Gerard Williams III to Tim Herbert, *Re: License payment model* (June 21, 2019) (QCARM_0020012) (emphasis added).

⁴⁴ Gulati, Manu. 30(b)(1) Deposition (Oct. 12, 2023) 181:19-22. See also *id.* 49:11-21 (“The understanding was that the completion of the ALA or the fact that there’s an ALA between NuVia and ARM does not automatically imply that, upon acquisition, the ALA would transfer to, let’s say the acquiring company. It typically would, but it’s not automatic.”).

his suggestion that Qualcomm did not need to negotiate for the right to use Arm technology in Nuvia products.

23. In order to avoid these facts, Professor Coates claims that parties can have lots of reasons to negotiate even if they do not have to:

[P]arties may seek consent for a number of other reasons, including, for example, to manage the potential risk of tensions with a counterparty that has or might assert rights under contracts that do not include provisions addressing all possible contingencies, to convey efforts to cooperate, to update and reset overall terms governing an ongoing commercial relationship, or to expand, contract, or right-size terms and conditions for both parties.⁴⁵

24. All of these possible reasons to negotiate are speculation, with no basis in the record. And the actual record is clear that Qualcomm negotiated with Arm because it had to.⁴⁶

25. Professor Coates' speculation about alternative reasons to negotiate is also irrelevant. All of these possible reasons would seek to achieve a better outcome than one's [REDACTED]. However, these reasons do not change the [REDACTED] itself. The [REDACTED] in this case, based on the record demonstrating the business

⁴⁵ Coates Report ¶¶ 94-95. Presumably arguing in the alternative, Professor Coates argues that “negotiation theory and transactional practice are not relevant in a contract dispute[.]” *Id.* ¶ 75. This facially absurd claim would render *any* analysis related to contract negotiation—including Professor Coates' own—inapplicable in this matter, or indeed any contractual dispute matter. Contrary to Professor Coates' claim, the negotiation theory that underpins the Qualcomm and Nuvia ALAs can shed light on the business justifications and processes that resulted in each ALA.

⁴⁶ See *supra* ¶ 22, n. 41-44.

context of the Nuvia ALA contract, is that [REDACTED]

[REDACTED]. This is reflected, among other things, by the fact that [REDACTED]

[REDACTED]⁴⁷ Professor Coates' claim is yet again an effort to distract from this basic point.

26. Despite his claims suggesting it was unnecessary and meaningless for Qualcomm to negotiate, Professor Coates attempts to draw unsupported conclusions from Arm's negotiating posture, noting that Arm did not immediately terminate Nuvia's ALA upon its acquisition and claiming that Arm would "seek to protect its rights more promptly" if it were "concerned about improper usage of its technology[.]"⁴⁸ For Professor Coates to penalize Arm for attempting to cooperate and re-negotiate a license agreement with Qualcomm rather than immediately resort to costly litigation, while simultaneously claiming that Qualcomm's willingness to negotiate means nothing, is a double standard of the highest order. The far simpler explanation, supported by the principles of negotiation theory, is that both sides were willing

⁴⁷ Email from Gerard Williams III to Lip-Bu Tan, *ARM latest* (June 19, 2019) (QCARM_0020011); Email from Gerard Williams III to Tim Herbert, *Re: License payment model* (June 21, 2019) (QCARM_0020012).

⁴⁸ Coates Report ¶ 118.

to negotiate because there was a ZOPA representing value to be claimed between them. Specifically, Qualcomm could structure a deal allowing it to license the valuable Arm-based Nuvia technology, and Arm could avoid the cost and relationship damage of having to protect its IP in court.

27. Additionally, I also disagree with Professor Coates' assertion that my application of negotiation theory is irrelevant to the Nuvia ALA with respect to the [REDACTED]

[REDACTED]⁴⁹ Yet again, Professor Coates mischaracterizes the evidence. He claims that "ARM's own employees believed such a requirement existed," but in fact he cites to only one Arm employee (who was not an attorney), and this employee was merely responding to an assertion by Qualcomm that background California law added a reasonableness requirement.⁵⁰ In any event, as I discussed in my Original Report, the [REDACTED] is a

[REDACTED]
[REDACTED] I also reviewed other ALAs Arm entered into [REDACTED]

⁴⁹ *Id.* ¶ 147.

⁵⁰ *Id.* n. 246.

██████████ which were separately negotiated and included the ██████████

██████████⁵¹

IV. PROFESSOR COATES’ DISTINCTION BETWEEN CHANGE OF CONTROL PROVISIONS AND ANTI-ASSIGNMENT PROVISIONS IS WRONG, ILLUSORY, AND INCOHERENT.

28. Professor Coates draws an artificial and incorrect distinction between CIC provisions and anti-assignment provisions. Specifically, he asserts that anti-assignment clauses “only have consequences for the contract in which the provision appears” and “are intended to protect against transfers of (or transfers of rights under) those contracts themselves,”⁵² while CIC provisions “give one party a right to veto, approve, or derive specific payouts (such as in a buy-sell arrangement, or a buyout option) upon the event of a change in control for the other contractual party.”⁵³ Even if this distinction were correct (it is not), it is a straw man. No one is arguing that ██████████

██████████⁵⁴ Yet again, his analysis is an effort to complicate and obfuscate the basic facts.

⁵¹ Original Report ¶¶ 57, 68-69.

⁵² Coates Report ¶ 101.

⁵³ *Id.* ¶ 100.

⁵⁴ *Id.* ¶ 103.

29. Contrary to Professor Coates’ suggestion, he and I agree that [REDACTED] of the Nuvia ALA was [REDACTED]. This is why the Original Report repeatedly refers to [REDACTED] as an anti-assignment provision.⁵⁵ Professor Coates nevertheless attempts the following sleight-of-hand:

No experienced M&A professional would treat an anti-assignment clause (even one with a transactional trigger) as equivalent to or giving rise to the right to veto a change in control altogether. As such, an anti-assignment provision would not customarily be expected to imply, much less explicitly grant, the right to secure an injunction to block a transaction. ... Professor Subramanian’s failure to distinguish between change-in-control and anti-assignment provisions appears to imply that ARM was entitled to prohibit Qualcomm’s acquisition of NUVIA.⁵⁶

30. This is a straw-man argument: no one is arguing that Arm had the right to “secure an injunction to block” Qualcomm’s acquisition of Nuvia or that “ARM was entitled to prohibit Qualcomm’s acquisition of NUVIA.”⁵⁷ Professor Coates’ insinuation that I say this is simply wrong.

31. The straw man arises from Professor Coates’ misunderstanding of CIC provisions. He claims that CIC provisions “give one party a right to veto” a

⁵⁵ See, e.g., Original Report ¶¶ 54, 60.

⁵⁶ Coates Report ¶¶ 103, 120.

⁵⁷ *Id.*

transaction,⁵⁸ “customarily give a contract party a true property right capable of effectively blocking an acquisition,”⁵⁹ and “can provide rights to effectively block or veto a change in control[.]”⁶⁰ This is wrong. Professor Coates provides no support for what he claims all “experienced M&A professional[s]” allegedly know about CIC provisions,⁶¹ because there is none. Customary CIC provisions do not necessarily or even customarily give veto rights; they simply, as here, trigger certain rights and obligations of the contracting parties. Morgan Lewis, for example, states: “A [CIC] provision gives a party certain rights under a contract, such as the right to receive payment, require consent, or terminate the contract, in the event of a specified trigger.”⁶² The Practical Law Institute similarly defines a CIC provision as: “A provision in an agreement giving a party certain rights (such as consent, payment or termination) in connection with a change in ownership or management of the other party to the

⁵⁸ *Id.* ¶ 100.

⁵⁹ *Id.*

⁶⁰ *Id.* ¶ 105. If Professor Coates is merely arguing that the consequence of some CIC provisions can be so onerous as to block a change of control, as a practical matter, then he and I have no disagreement. But that is not the case with the CIC provision here, because Qualcomm acquired Nuvia.

⁶¹ *See id.* ¶ 103.

⁶² Perry, Jessica and Jared Wilkerson. “Real-World Litigation Impacts of Contract Clauses in Energy Contracts: Defining Change of Control Provisions Favorably.” *Morgan Lewis* (Mar. 29, 2023). <<https://www.morganlewis.com/blogs/powerandpipes/2023/03/real-world-litigation-impacts-of-contract-clauses-in-energy-contracts-defining-change-of-control-provisions-favorably>> (accessed Mar. 4, 2024).

agreement.”⁶³ Under these definitions, the anti-assignment provision in the Nuvia ALA is readily termed a CIC provision, as it is customarily understood in transactional practice and in the negotiations literature. And, in any event, the label used for the anti-assignment provision in the relevant Nuvia agreement does not change the functional analysis of that provision.

32. Professor Coates contrasts his “veto right” and [REDACTED] with the rights that arise under anti-assignment clauses: “Broad veto rights over change of control are not customarily understood from anti-assignment clauses, even if they contain a transactional trigger.”⁶⁴ This is correct. But no one is claiming that the anti-assignment clause contained in [REDACTED] of the Nuvia ALA gives [REDACTED] [REDACTED] [REDACTED] Instead, what the [REDACTED] [REDACTED] [REDACTED] [REDACTED]

⁶³ “Change of Control Clause.” *Practical Law*. <[https://uk.practicallaw.thomsonreuters.com/0-382-3325?transitionType=Default&contextData=\(sc.Default\)&firstPage=true](https://uk.practicallaw.thomsonreuters.com/0-382-3325?transitionType=Default&contextData=(sc.Default)&firstPage=true)> (accessed Mar. 4, 2024).

⁶⁴ Coates Report ¶¶ 101, 103.

⁶⁵ Similarly, Professor Coates quotes research from Ayotte and Hansmann stating: “If the counterparty to a contract with a corporation *wishes to limit the persons to whom ownership or control of the corporation can be sold*, it must do this through specific language to that effect in the contract[.]” *Id.* ¶ 105 (emphasis added). I do not disagree with this straightforward assertion, and it does not change my analysis of the Nuvia ALA provisions, which do not encompass a right to veto an acquisition.

[REDACTED]

[REDACTED]

33. Even the “leading practitioners”⁶⁷ who Professor Coates cites make the same point. Professor Coates quotes an article by two partners from Skadden Arps for the proposition that a “common misconception in drafting and interpreting contracts” is that “an anti-assignment clause covers a party’s change of control.”⁶⁸ But here is what the quoted language says in full:

A common misconception in drafting and interpreting contracts, including IP licenses, is that an anti-assignment clause covers a party’s change of control. However, prohibitions on changes of control are likely not implied from a simple anti-assignment clause. ... Restrictions on changes of control must therefore be separately addressed. A change-of-control provision gives a party[] certain rights in connection with the other party’s transaction. Although some change-of-control provisions purport to void the transaction, the more direct approach is to provide that a change of control is equivalent to a material breach of the agreement or grounds for termination, or both.⁶⁹

⁶⁶ As I described in my Original Report, anti-assignment provisions are common ways for businesses to protect against situations where an acquisition of a licensee would be used by the acquiring company to bypass the licensor’s licensing framework and gain access to licensed technology by acquiring the licensee. Original Report ¶ 42. That is, the anti-assignment provision in the Nuvia ALA was not about preventing Qualcomm from purchasing Nuvia but rather about protecting Arm from Qualcomm (or a similarly positioned entity) effectively assigning Nuvia’s Arm-licensed technology to itself via acquisition.

⁶⁷ Coates Report ¶ 106.

⁶⁸ *Id.*

⁶⁹ Ziff, Elaine D. and John G. Deming. “IP Licenses: Restrictions on Assignment and Change of Control.” *Practical Law Company* (2012). <https://www.skadden.com/-/media/Files/Publications/2012/02/Publications2679_0.pdf?sc_lang=en> (accessed Mar. 4, 2024) at 10, cited in Coates Report ¶ 106.

34. In other words: if you want to give one party a veto right over a change of control, you must do so explicitly. Anti-assignment provisions do not do this on their own; instead, they simply prevent the assignment of a contract, where further change-in-control language may be added to restrict assignment upon a change of control (as with the Nuvia ALA). I agree with this commonsense point. Professor Coates' insinuation that I succumb to a "common misconception" that an anti-assignment clause prohibits a change of control is simply wrong. Nowhere do I say this in the Original Report, and Professor Coates provides no such citation to support his insinuation.

35. When boiled down to its essence, Professor Coates' argument seems to be as follows: (1) CIC provisions permit one or both parties to veto a change of control at the other; (2) I am confusing a CIC provision with an anti-assignment provision; (3) [REDACTED] is an anti-assignment provision, which is different from a CIC provision; and (4) because of this difference, [REDACTED] of the Nuvia ALA [REDACTED]

[REDACTED] None of these points are correct; and, even if they were, this distillation reveals the incoherence of the argument. The artificial and incorrect difference that Professor Coates claims between CIC provisions and anti-assignment clauses is yet again nothing more than an effort to distract from the plain language of the contracts.

V. PROFESSOR COATES DOES NOT DISPUTE THAT THE PLAIN LANGUAGE OF THE NUVIA ALA REQUIRES [REDACTED]

36. In yet another straw-man attack, Professor Coates repeatedly claims that I argue that Arm’s ALA with Nuvia prevents Qualcomm from using Arm technology in its own products, pursuant to its own ALA with Arm.⁷⁰

37. This is an egregious mischaracterization of my report. No one is claiming that Qualcomm cannot use Arm’s technology delivered under Qualcomm’s ALA in Qualcomm’s products. Instead, Professor Coates and I agree that the plain language of the Nuvia ALA requires Nuvia to [REDACTED]

[REDACTED]

[REDACTED] and [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] As described in the Original Report, there are sound business

⁷⁰ See, e.g., Coates Report ¶¶ 92, 120.

⁷¹ Id. ¶¶ 29, 125 (citing Nuvia ALA); Nuvia ALA at ARM_00059196.

reasons for requiring the return or destruction of these technologies upon termination.⁷²

38. One such reason that I described is to protect against situations “where an acquisition of a licensee would ... dramatically change the scope of rights or obligations between the licensor and licensee[.]”⁷³ Professor Coates insists that this motivation cannot apply in this context because, according to him, there is nothing to “support the notion that there has been any change, let alone a dramatic change, in the scope of rights and obligations as between ARM and Qualcomm” with the Nuvia acquisition.⁷⁴

39. Professor Coates is incorrect. In the Original Report, I described how the anticipated business context was vastly different for Nuvia and Qualcomm’s agreements, with the negotiated terms reflecting Nuvia’s more limited market scope.⁷⁵ Professor Coates admits as much when he states that his

⁷² Original Report Section VI.A.

⁷³ *Id.* ¶ 42.

⁷⁴ Coates Report ¶ 112.

⁷⁵ Original Report ¶¶ 27, 65; Segars Dep. 113:24-115:17 (discussing how the royalty rates under Nuvia’s and Qualcomm’s ALAs differed and stating that “the agreement between Arm and NuVia [] anticipated fees and royalties based on what NuVia were intending to do.”); Herbert, Tim. Deposition (Oct. 25, 2023) (“Herbert Dep.”) 318:7-18 (reading from a document discussing “Nuvia/Qualcomm Plans” that “[Arm] discounted the ALA license fee to Nuvia because they had a limited scope, if Qualcomm wants to expand the usage to other markets, we expect to be renumerated.”); Williamson Dep. 38:23-39:24 (testifying that Qualcomm’s acquisition of Nuvia “could result in the core being deployed in any number of markets” including those beyond the originally anticipated market of cloud server designs), 62:24-63:24

“understanding is that the ‘expected work scope’ of the NUVIA ALA was limited to NUVIA’s [REDACTED] [REDACTED]” while “the ‘expected work scope’ of the Qualcomm ALA [REDACTED] [REDACTED] and indeed included “[REDACTED]” in “contrast” to Nuvia’s work.⁷⁶

Professor Coates appears to have misunderstood my argument, given that he agrees with it. The expected work scope for Nuvia’s collaboration with Arm was different than the expected work scope for Qualcomm’s collaboration with Arm at the time that each company’s ALAs were negotiated and drafted, prior to the Nuvia acquisition. These differences would be reflected in the different

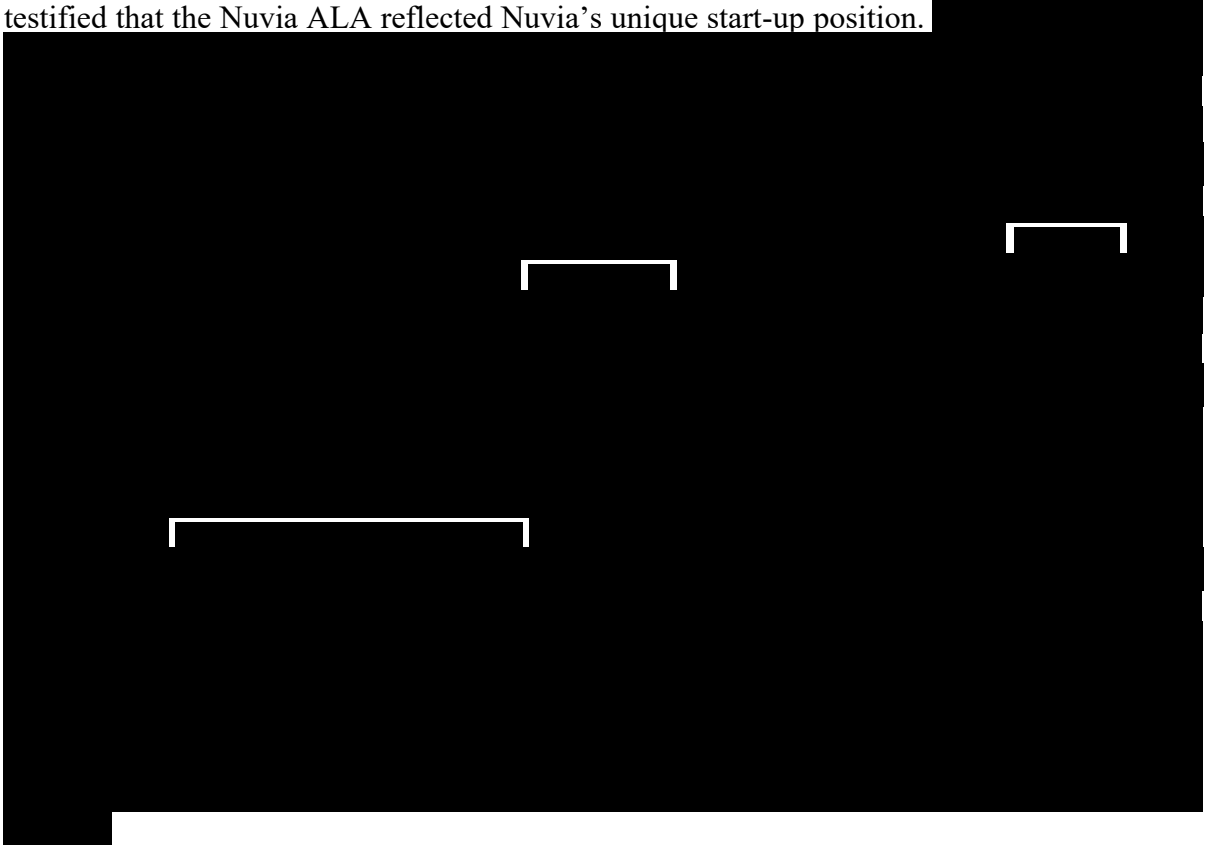
(testifying that the Qualcomm ALA was agreed to in 2013 and that by 2021 [when Nuvia was acquired], it was “a very different time in the relationship and market”).

⁷⁶ Coates Report ¶¶ 113-14.

negotiations that occurred,⁷⁷ which produced different and non-interchangeable licensing agreements.⁷⁸

40. On the derivative technologies referenced in the Nuvia ALA, Professor Coates yet again mischaracterizes my report, claiming that I assert that Arm and Nuvia

⁷⁷ I reiterate that Nuvia negotiators understood this fact at the time of negotiations with Arm and testified that the Nuvia ALA reflected Nuvia's unique start-up position.



⁷⁸ Professor Coates also waves away negotiation differences relating to Nuvia's status as a start-up by insisting that Arm could have included a "consent-requiring change-in-control clause" to give Arm the right to "veto [] such an acquisition[.]" Coates Report ¶¶ 115-16. This logical fallacy—that Arm could not structure a contract to protect its IP in the event of a change of control of Nuvia without bargaining for an absurdly broad right to veto any proposed acquisition of Nuvia—ignores the fact that more tailored solutions were available to Arm, such as the anti-assignment clause and transactional trigger it eventually included, and ignores the real negotiating differences that resulted from Nuvia's unique business context, such as its status as a start-up. *See* Original Report ¶¶ 63-64.

“agree[d] to a broad technology destruction provision that would require the discontinuance of all NUVIA’s technology, *irrespective of whether it contained ARM Confidential Information or not.*”⁷⁹ Yet again, this is an absurd claim. No one is claiming that, upon a change in control, Nuvia must stop using its own technology that does not fall within the scope of the termination provisions discontinuance and destruction requirements. Instead, the plain language of the Nuvia ALA requires that [REDACTED]

[REDACTED]

[REDACTED] and [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] As described in the Original Report, there are sound business reasons for requiring the destruction of derivative technologies and embodiments.⁸¹

⁷⁹ Coates Report ¶ 146 (emphasis added).

⁸⁰ *Id.* ¶¶ 29, 125 (citing Nuvia ALA); Nuvia ALA at ARM_00059196.

⁸¹ Original Report Section VI.A.

41. Professor Coates further asserts that the technology developed by Nuvia “using rights under its ALA” would not be subject to the destruction or return obligations of [REDACTED] because it comprises Nuvia’s “proprietary designs.”⁸² But this claim ignores the plain language of [REDACTED] more fully in the preceding paragraphs. Nuvia’s ownership of technology is irrelevant to its obligations upon termination, and notwithstanding any ownership rights Nuvia may have; [REDACTED]

[REDACTED] Put simply, ownership does not provide a blanket exception to contractual commitments or other legal obligations (e.g., many companies are enjoined from using or selling products, notwithstanding their ownership of those products, based on an injunction against patent infringement).

VI. PROFESSOR COATES’ OWN EXAMPLES AND DR. KENNEDY’S FAILURE TO QUANTIFY DAMAGES DEMONSTRATE WHY DAMAGES HERE COULD NOT BE CALCULATED WITH REASONABLE CERTAINTY.

42. Professor Coates argues in his report that the outcome of a hypothetical renegotiation between Qualcomm and Arm over the licensing issues at hand is

⁸² Coates Report ¶ 123.

not necessarily “‘extremely difficult’ to predict.”⁸³ He provides examples of other contexts in which estimation is performed that lacks “great precision” or is “inherently imprecise,” such as valuing a business or determining damages for a hypothetical unspecified litigation.⁸⁴

43. While I agree that valuation is an imperfect science, Professor Coates’ examples relate to arenas wherein the prediction or estimation of an exact value is possible based on established methodologies, whether from specific techniques such as a “‘discounted cash flow’ valuation technique”⁸⁵ or because the harm in a hypothetical litigation is readily quantifiable.⁸⁶ Notably, he does not offer *any* examples of predicting the outcome of a multi-issue negotiation between sophisticated parties.

⁸³ *Id.* ¶¶ 142-44.

⁸⁴ *Id.* ¶¶ 140-41 (“[B]usinesses are nonetheless routinely capable of being valued quantitatively without requiring that one identify a specific value ‘with great precision.’ Consider the standard and well-accepted ‘discounted cash flow’ valuation technique of projecting future cash flows and discounting those cash flows to present value using an estimated cost of capital.”; “[I]nitial estimates of any loss or form of damage (at the time of a contract signing, and often at the time of breach) are inherently imprecise because they are estimates of counterfactuals[.] ... [T]here are ways to arrive at an understanding of how to value a provision or to say that this is a reasonable range of outcomes. Courts do this all the time.”).

⁸⁵ *Id.* ¶ 140.

⁸⁶ *Id.* ¶ 141.

44. Under certain assumptions, negotiation theory provides an average prediction for single-issue negotiations, namely the midpoint of the ZOPA.⁸⁷ However, negotiation theory does not provide a prediction for multi-issue negotiations,⁸⁸ such as the hypothetical Arm-Qualcomm renegotiation.
45. The difficulty of predicting the outcome of this renegotiation is particularly high because over two years have passed since the breakdown of negotiations in this matter, making it even more inappropriate to use any proposals from the parties' previous talks to inform a current prediction, and that negotiation turned primarily on [REDACTED]
- [REDACTED]
- [REDACTED] In particular, unlike the initial negotiation, a hypothetical renegotiation would have to account for the possibility that [REDACTED]
- [REDACTED] ■ ■ Professor

⁸⁷ Subramanian, Guhan. *Dealmaking: The New Strategy of Negotiauctions*, 2nd edition. New York: W. W. Norton & Company (2020) at 18.

⁸⁸ Graphically, the outcome of a multi-issue negotiation can fall anywhere in the green shaded area of Figure 2 in my Original Report ¶ 39.

⁸⁹ See Original Report ¶¶ 92-101.

⁹⁰ Professor Coates also contends that “[g]iven that almost one year passed from the NUVIA acquisition and ARM’s termination of the NUVIA ALA, it seems unlikely at best that Qualcomm acquiring NUVIA and continuing to develop technology created under the NUVIA ALA would have led other licensees directly or indirectly to change their behavior with respect to ARM[.]” Coates Report ¶ 91. Professor Coates’ argument completely ignores that such a consequence is inherently tied to the outcome of this publicized litigation, which is of course still pending.

Coates contends that [REDACTED]

[REDACTED]⁹¹ This is a non sequitur; even if Arm had been thinking ahead to these possibilities if negotiations failed (a contention for which Professor Coates offers no support) it does not mean that these possibilities were baked into the numbers at the time, let alone could be quantified today.

For example, while Arm might have contemplated [REDACTED]

[REDACTED] Arm could not have known that [REDACTED]

46. Another of Qualcomm's experts, Dr. Patrick F. Kennedy, also denies that the harm to Arm from a [REDACTED],⁹³

⁹¹ *Id.* ¶ 144.

⁹² Original Report ¶ 71, quoted in Coates Report ¶ 144.

⁹³ Kennedy Report ¶¶ 213-214.

instead asserting that “ [REDACTED]

[REDACTED] ■

47. Despite this claim that damages *can* be calculated, Dr. Kennedy does not attempt to *actually* calculate damages in this matter. In fact, Dr. Kennedy does not even provide a description of a methodology he would use to calculate damages. These are glaring omissions, because Dr. Kennedy’s “professional experience includes assessing economic damages within and outside of the litigation environment.”⁹⁶ If damages were readily calculable in this case, as Professor Coates and Dr. Kennedy claim, one would think that Dr. Kennedy would have done so, in view of his background and professional experience, or, at the very least, provided a roadmap to doing so.
48. Dr. Kennedy’s claims ignore the high degree of uncertainty associated with the outcome of a hypothetical renegotiated deal. In fact, nowhere in Dr. Kennedy’s report does he consider negotiation theory at all. As such, even putting aside the documented impossibility of pinpointing the outcome of a multi-issue negotiation, Dr. Kennedy’s arguments are incapable of informing a reader

⁹⁴ *Id.* ¶ 214.

⁹⁵ Dr. Kennedy disagrees with my conclusions “[f]or the reasons discussed in detail in the preceding sections of this report,” but does not explicitly address any of the points I made in my Original Report, instead responding to another expert entirely. *Id.* As such, I respond to his central conclusions to the extent they relate to my analysis of a hypothetical renegotiated deal.

⁹⁶ *Id.* ¶ 4.

where within the wide ZOPA between Qualcomm and Arm a renegotiated deal might end up.

49. Dr. Kennedy asserts without any basis in negotiation theory that “[t]hese commercial negotiations [between Qualcomm and Arm, following the Nuvia acquisition] address issues at play in this litigation, and, therefore, demonstrate that [REDACTED]

██████████.”⁹⁷ In doing so, Dr. Kennedy inappropriately conflates a non-final proposal from one party during an on-going negotiation under different circumstances prior to termination with the final outcome of a negotiation. Dr. Kennedy also fails to consider the difficult-to-quantify factors of ██████████

Because Dr. Kennedy fails to apply the principles of negotiation theory relevant to understanding a

⁹⁷ *Id.* ¶ 83.

⁹⁸ In the Original Report, I documented how Arm’s reputation and licensing ecosystem would be damaged if it fails to protect its IP in this matter, based on testimony from Arm employees and relevant industry contextual factors. *See* Original Report ¶¶ 91, 93-100.

hypothetical renegotiation between Arm and Qualcomm, his conclusions are unsupported.

Dated March 25, 2024

A handwritten signature in black ink, appearing to be 'G. Subramanian', written above a horizontal line.

Guhan Subramanian

Appendix A

Materials Considered

Materials Considered¹

Expert Reports

Expert Rebuttal Report of Prof. John Coates. *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.* (D. Del. No. 1:22-cv-01146) (Feb. 27, 2024).

Expert Report of Patrick F. Kennedy, Ph.D. *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.* (D. Del. No. 1:22-cv-01146) (Feb. 27, 2024).

Expert Report of Professor Guhan Subramanian. *Arm Ltd. v. Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc.* (D. Del. No. 1:22-cv-01146) (Dec. 20, 2023).

Depositions

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Relevant Produced Documents

Agreements

[REDACTED] to the Architecture License Agreement Between Arm Limited and NuVia, Inc (Mar. 27, 2020) (ARM_00057230).

[REDACTED] to the Architecture License Agreement Between Arm Limited and Qualcomm Global Trading Pte, Ltd. (May 29, 2013) (ARM_00063298).

Master Royalty Schedule Between Qualcomm Global Trading Pte, Ltd. and Arm Limited (May 30, 2013) (LES-LTM-20780) (ARM_01298891).

Technology License Agreement (“ALA”) Between Arm Limited and NuVia, Inc. (Sept. 27, 2019) (ARM_00059183).

¹ In preparing my report, I considered the documents listed here along with any items cited or referenced in the body and footnotes of my report.

Emails

[REDACTED]

[REDACTED]

Miscellaneous

Klausner, Michael and Guhan Subramanian. *Deals: The Economic Structure of Business Transactions*. Page Proofs. Harvard University Press, forthcoming (ARM_01431858).

Publications

“Change of Control Clause.” *Practical Law*. <[https://uk.practicallaw.thomsonreuters.com/0-382-3325?transitionType=Default&contextData=\(sc.Default\)&firstPage=true](https://uk.practicallaw.thomsonreuters.com/0-382-3325?transitionType=Default&contextData=(sc.Default)&firstPage=true)> (accessed Mar. 4, 2024).

Perry, Jessica and Jared Wilkerson. “Real-World Litigation Impacts of Contract Clauses in Energy Contracts: Defining Change of Control Provisions Favorably.” *Morgan Lewis* (Mar. 29, 2023). <<https://www.morganlewis.com/blogs/powerandpipes/2023/03/real-world-litigation-impacts-of-contract-clauses-in-energy-contracts-defining-change-of-control-provisions-favorably>> (accessed Mar. 4, 2024).

Subramanian, Guhan. *Dealmaking: The New Strategy of Negotiauctions*, 2nd edition. New York: W. W. Norton & Company (2020).

Ziff, Elaine D. and John G. Deming. “IP Licenses: Restrictions on Assignment and Change of Control.” *Practical Law Company* (2012). <https://www.skadden.com/-/media/Files/Publications/2012/02/Publications2679_0.pdf?sc_lang=en> (accessed Mar. 4, 2024).

Exhibit 18

From: Ziad Asghar </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F80965C73CBC45719B2B9AA1BF753456-ZASGHAR>
To: Jonathan Weiser
Sent: 11/21/2022 5:28:47 PM
[REDACTED]
[REDACTED]

From: Will Abbey <Will.Abbey@arm.com>
Sent: Wednesday, June 2, 2021 8:14 AM
To: RK Chunduru <rkc@qti.qualcomm.com>; Ziad Asghar <zasghar@qti.qualcomm.com>
Cc: Paul Williamson <Paul.Williamson@arm.com>
Subject: [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

IMPORTANT NOTICE: The contents of this email and any attachments are confidential and may also be privileged. If you are not the intended recipient, please notify the sender immediately and do not disclose the contents to any other person, use it for any purpose, or store or copy the information in any medium. Thank you.

Exhibit 19

From: Aleeza Lawson </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F974D895AAE448C8BBCB5F78C6BAD281-ALEEZAL>
To: Laura Sand; Jonathan Weiser; Cristiano Amon; Ziad Asghar; Alvaro Ramos; Mark Snyder (Corp Litigation); RK Chunduru; Keith Kressin; Akash Palkhiwala; Will Wyatt
CC: Kurt Kjelland
Sent: 5/6/2021 4:40:58 AM
[REDACTED]
[REDACTED]
[REDACTED]

FYI

Qualcomm

Aleeza Lawson | Chief of Staff to the President
Qualcomm Inc.
O: +1 858.651.8653 | M: +1 619.773.5225

From: Cristiano Amon <camon@qualcomm.com>
Sent: Wednesday, May 5, 2021 7:23 PM
To: Simon.Segars@arm.com

[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

CONFIDENTIAL SETTLEMENT COMMUNICATION: FRE 408

Exhibit 20

**United States District Court
District of Delaware
Civil Action No. 01:22-cv-01146-MN**

**Qualcomm Inc.,
Qualcomm Technologies, Inc., and
NuVia, Inc.**

v.

Arm Ltd.

**Expert Reply Report of Patrick F. Kennedy, Ph.D.
June 24, 2024**

QUALCOMM INC., QUALCOMM TECHNOLOGIES, INC., AND NUVIA, INC. v. ARM LTD.

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I. INTRODUCTION

1. I submitted an opening report dated May 20, 2024 (“Kennedy Counterclaim Report”), in which I provided my opinions based on the available information produced to date. I incorporate such opinions and analysis herein by reference, even if not specifically stated.¹ Since the issuance of my report, I understand from Counsel that no new information has been produced by Arm with respect to Counterclaim-Plaintiffs’ requests for production. Therefore, my opinions found in the Kennedy Counterclaim Report remain the same.²

2. Arm’s retained expert, W. Todd Schoettelkotte, submitted an expert report in response to the Kennedy Counterclaim Report dated June 10, 2024 (“Schoettelkotte Rebuttal Report”).³ The purpose of this report is to provide my opinions in reply to the Schoettelkotte Rebuttal Report.

II. RESPONSES TO THE SCHOETTELKOTTE REBUTTAL REPORT

3. I describe Mr. Schoettelkotte’s opinions briefly and provide my responses to the Schoettelkotte Rebuttal Report below. Also, I may not provide a response to all of Mr. Schoettelkotte’s criticisms; however, my lack of response does not imply that I agree with his criticisms.

A. Summary of Mr. Schoettelkotte’s Opinions

4. The Schoettelkotte Rebuttal Report provides responses to the Kennedy Counterclaim Report, wherein it criticizes my but-for assumptions, namely (a) Arm licensees

¹ Expert Report of Patrick F. Kennedy, Ph.D., May 20, 2024 (hereinafter, the Kennedy Counterclaim Report). I, also, submitted an opening report dated February 27, 2024 in this matter.

² To this report, I append updated Exhibits A, B and C.

³ Reply [sic] Expert Report of W. Todd Schoettelkotte Relating to Remedies For Counterclaim-Plaintiffs’ Claims, June 10, 2024 (hereinafter, the Schoettelkotte Rebuttal Report).

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████████████████████⁴ Further, Mr. Schoettelkotte disagrees with my damages methodology and suggests that there is sufficient and existing information to quantify (a) Arm licensees' fees and royalties, (b) the value related to features in CMN-Kampos, (c) the relative technical apportionment, and (d) the head-start time period to independently develop the Nuvia Confidential Information.⁵ Mr. Schoettelkotte also proffers an apparently legal opinion that the Counterclaim-Plaintiffs must establish that they have been harmed by the alleged benefits of the Nuvia Confidential Information.⁶

5. I do not rebut Mr. Schoettelkotte's opinions based on information that is unavailable to me, but reserve the right to do so should the information be made available to me. I also do not rebut Mr. Schoettelkotte's opinions concerning legal topics as I am not qualified to do so. Nor do I opine on Mr. Schoettelkotte's opinions concerning technical issues such as the quantification of the relative technical value of the At-Issue CMN Features or the length of a head start period as I am not qualified to do so. Otherwise, I disagree with Mr. Schoettelkotte's opinions, as described in more detail below.

⁴ Schoettelkotte Rebuttal Report, p. 4.

⁵ Schoettelkotte Rebuttal Report, p. 5.

⁶ Schoettelkotte Rebuttal Report, pp. 4-5.

B. Responses to the Schoettelkotte Rebuttal Report**i. Mr. Schoettelkotte wrongly criticizes my analysis and does not proffer his own damages calculation despite claiming there is sufficient information**

6. Mr. Schoettelkotte opines that I identified the relevant licensees, license fees, and royalties for my analysis in the Kennedy Counterclaim Report, but “chose to do nothing with the available information.”⁷ However, Mr. Schoettelkotte misses the point entirely. As stated in the Kennedy Counterclaim Report, there is a deficiency in the production of relevant documents that are required to quantify damages and, hence, there is a lack of evidence in the record.⁸ The Schoettelkotte Rebuttal Report criticizes my report because of this lack of evidence, yet, as I understand, the lack of evidence is due to insufficient production by Arm.

7. Mr. Schoettelkotte attempts to backfill the lack of documentation with a conversation with [REDACTED] indicating that additional documentation may exist and information that Mr. Schoettelkotte appears to consider as relevant.⁹ For example, Mr. Schoettelkotte relies on a discussion with [REDACTED]

[REDACTED] This information disclosed to Mr. Schoettelkotte by [REDACTED] would typically be found in Arm’s license agreements with these licensees, which I understand Counterclaim-Plaintiffs have requested and Arm has not produced to date.¹¹

⁷ Schoettelkotte Rebuttal Report, pp. 19-20. For example, Mr. Schoettelkotte states that I recognize certain information like Nuvia TLA, Nuvia ALA and \$5,850 in royalty payments. This is true, but these are observations based on the available information and do not reflect all the license fees and royalties related to CMN-Kampos.

⁸ Kennedy Counterclaim Report, pp. 21-27.

⁹ Schoettelkotte Rebuttal Report, p. 21.

¹⁰ Schoettelkotte Rebuttal Report, p. 21.

¹¹ Arm Ltd.’s Responses and Objections to Qualcomm’s Seventh Set of Requests for Production (Nos. 148-154), May 3, 2024, pp. 10-11. Request for Production No. 152: “All Documents, Communications, and analyses concerning the negotiation and execution of the licenses containing

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8. Further, Mr. Schoettelkotte points to two Arm spreadsheets produced in this matter, and opines that I did not discuss these spreadsheets in my report.¹² But Mr. Schoettelkotte is wrong. In fact, I provide my observations concerning these spreadsheets, but these documents do not provide sufficient information and the record is incomplete.¹³ For example, as I state in the Kennedy Counterclaim Report, Guy Larri, Arm's 30(b)(6) witness, was asked about one of the spreadsheets,¹⁴ which appears to [REDACTED]

[REDACTED]¹⁵ Also, regarding the other spreadsheet,¹⁶ I describe what appears to [REDACTED]

9. In addition, Mr. Schoettelkotte opines that I did not actually perform any damages calculations, but that I could have with the evidence produced to date.¹⁸ I disagree for the reasons set forth in the Kennedy Counterclaim Report.¹⁹ Despite his claims that there is sufficient information, Mr. Schoettelkotte does not provide his own calculations to quantify damages.

ii. Mr. Schoettelkotte's criticisms about my but-for assumptions relating to Arm's benefits and redevelopment of Nuvia Confidential Information lack support

10. In the Kennedy Counterclaim Report, I opine that in the but-for world Arm would have benefited through the receipt of licensing fees and royalties related to the At-Issue CMN

CMN, NCI-Booker, and MMU products or similar technologies, including license agreements, proposed terms, term sheets, rationale for license fees, royalties, internal estimates, forecasts, models, and basis for license fees, including but not limited to as between ARM and the following [licensees]..."

¹² ARM_01237494 and ARM_01460538.

¹³ Kennedy Counterclaim, p. 24.

¹⁴ ARM_01460538.

¹⁵ Kennedy Counterclaim Report, p. 25.

¹⁶ ARM_01237494.

¹⁷ Kennedy Counterclaim Report, pp. 24-25.

¹⁸ Schoettelkotte Rebuttal Report, p. 19.

¹⁹ Kennedy Counterclaim Report, pp. 21-27.

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Features.²⁰ Mr. Schoettelkotte disagrees. He opines that there is a “lack of demand, use, or availability of many of the At-Issue CMN Features,” and that my assumptions regarding such topics lack support.²¹ However, the only bases for Mr. Schoettelkotte’s opinion about the lack of demand, use, or availability are references to the technical expert report, new conversations with Arm personnel, deposition testimony, and a single cite to the CMN-700 Technical Reference Manual.²² As described below, Mr. Schoettelkotte’s bases are insufficient.

11. First, Mr. Schoettelkotte cites to the expert report of Arm’s retained technical expert, Dr. Robert Colwell.²³ However, the opinions in the Colwell Rebuttal Report that Mr. Schoettelkotte relies upon also only refer to new conversations with Arm personnel as support.²⁴ These new conversations with Arm personnel do not fill the gaps in the information necessary to complete a damages calculation. Instead, this new information consists of undocumented assertions regarding a limited set of CMN-Kampos features, and these conversations are not available to me to rebut or refute.

12. Second, Mr. Schoettelkotte directly cites to conversations with Arm personnel without documentary support.²⁵ Again, these new conversations are not available to me to rebut or refute.

²⁰ Kennedy Counterclaim Report, pp. 21-22.

²¹ Schoettelkotte Rebuttal Report, pp. 15-16.

²² Schoettelkotte Rebuttal Report, p. 16.

²³ See *generally* Rebuttal Expert Report of Dr. Robert P. Colwell to Dr. Annavaram’s Opening Expert Report Regarding Qualcomm’s Counterclaim, June 10, 2024 (hereinafter, the “Colwell Rebuttal Report”).

²⁴ Mr. Schoettelkotte references the Colwell Rebuttal Report as support that features have “limited value” (Schoettelkotte Rebuttal Report, p. 14 citing to Colwell Rebuttal Report, pp. 23, 28). For example, Dr. Colwell opines that “[b]ased on my conversation with Mr. Werkheiser regarding LB, I understand that only Nuvia requested this feature. Further, I understand that the LB request – and subsequent implementation – was tailored to Nuvia’s very specific needs and design. As such, no other partner has used this feature.” Colwell Rebuttal Report, p. 23.

²⁵ Schoettelkotte Rebuttal Report, pp. 14-16.

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13. Third, Mr. Schoettelkotte's reference to testimony of [REDACTED]
[REDACTED],²⁶ does not consider the full context of his testimony as [REDACTED]

[REDACTED]²⁷ Mr. Schoettelkotte also points to the testimony of Mr. Larri that there

[REDACTED]²⁸ While, Mr. Schoettelkotte opines that there is a [REDACTED]

14. Fourth, Mr. Schoettelkotte's points to the [REDACTED] within the CMN-700
Technical Reference Manual to show [REDACTED]²⁹ The

fact that the At-Issue CMN Features are not listed as "key features" in the single CMN reference
manual cited by Mr. Schoettelkotte does not indicate a lack of demand or use. In fact, Arm
confirmed that at least [REDACTED]

15. Similarly, in criticizing my assumption that Arm would replace the features that Arm
would have had to remove, Mr. Schoettelkotte states "available evidence indicates that the [REDACTED]

[REDACTED] Yet, the only "available

²⁶ Deposition of Mark Werkheiser, December 7, 2023, p. 8; Schoettelkotte Rebuttal Report, p. 15.
"For example, Mr. Werkheiser testified that the requested CMN features "did improve the fabric for
[Nuvia's] use cases, and most – most of the features were targeted for their use case."

²⁷ Deposition of Mark Werkheiser, December 7, 2023, pp. 54-55.

²⁸ Deposition of Guy Larri, May 10, 2024, p. 197.

²⁹ Schoettelkotte Rebuttal Report, p. 16.

³⁰ Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Fifth Set of Interrogatories
(Nos. 26-28), May 10, 2024, pp. 13-22.

³¹ Schoettelkotte Rebuttal Report, p. 17.

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evidence” that he introduces is the same, limited documentation (e.g., conversations with or testimony of Arm personnel and a single cite to the CMN-700 Technical Reference Manual), and for the same reasons described above, these references are unavailable, insufficient and incomplete.³² Moreover, Mr. Schoettelkotte’s conversations with Arm personnel indicate that Arm apparently has relevant information on licensee usage and requests by feature, which I understand Counterclaim-Plaintiffs have requested.³³ However, Mr. Schoettelkotte did not provide any references to the underlying information and I understand that Arm has not, to date, produced this information.

16. Furthermore, Mr. Schoettelkotte’s opinions about demand, usage, and availability are limited to a specific set of features that Arm identified in its interrogatory responses.³⁴ However, I understand that the At-Issue CMN Features are not limited to the five features that Mr. Schoettelkotte identifies.³⁵ Specifically, based on my understanding from Counsel, Counterclaim-Plaintiffs assert that they do not have sufficient information from Arm to identify the scope of the

³² Schoettelkotte Rebuttal Report, p. 16.

³³ Qualcomm’s Sixth Set of Requests for Production (Nos. 125-147), March 29, 2024, pp. 6, 8. See, e.g., Request for Production No. 130: “All Documents and Communications discussing or concerning the implementation of features requested by NUVIA in any products distributed by ARM to its business partners other than NUVIA or to the public.” Also, see Kennedy Counterclaim Report, p. 24: “I further understand that Arm has not produced documents identifying the specific partners who are claimed to have made overlapping feature requests and Arm’s Rule 30(b)(6) witness, Guy Larri, did ‘[n]ot specifically’ know who those partners were.”

³⁴ Arm Ltd.’s First Supplemental Objections and Responses to Qualcomm’s Fifth Set of Interrogatories (Nos. 26-28), May 10, 2024, pp. 13-18.

³⁵ See, e.g., Opening Expert Report of Dr. Murali Annavaram regarding Qualcomm’s Counterclaim, May 20, 2024 (“Annavaram Counterclaim Report”), p. 2. Dr. Annavaram opines that a “I have been informed that Nuvia provided Confidential Information to ARM, requesting that ARM include certain features in ARM’s Coherent Mesh Network [] products.[] I understand that the parties agree that Arm implemented many of the features that Nuvia requested. A subset of these features are specifically referred to as...” The subset of features that Dr. Annavaram refers to are the same five features that Mr. Schoettelkotte and Dr. Colwell discuss. Specifically, Mr. Schoettelkotte opines that I limited the At-Issue CMN Features to a subset of features, namely Deep MCS, LB and PBHA support, Peak Power Management, Strong NC and HND Turnaround Path Disconnect. Mr. Schoettelkotte mischaracterizes my testimony as I state that I understand that the At-Issue CMN Features include, but are not limited to, this subset of features. (Schoettelkotte Rebuttal Report, p. 9; Kennedy Counterclaim Report, p. 21).

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At-Issue CMN Features, which is the starting point of a damages analysis. The lack of information regarding the full scope of the At-Issue CMN Features is a threshold issue, as damages flow from the identified set of At-Issue CMN Features. As the Counterclaim-Plaintiffs assert, Arm has not provided sufficient information to begin the analysis.

iii. Mr. Schoettelkotte's opinion that "Kennedy failed to consider available documents to value the new features in CMN-700" is flawed

17. Mr. Schoettelkotte opines that there was sufficient available information produced in the matter to quantify the value of the new features in CMN-Kampos.³⁶ The only information that Mr. Schoettelkotte identifies as relevant for this opinion is the fees in the Nuvia TLA.³⁷ Mr. Schottelkotte notes a [REDACTED] for CMN-700, but he does not arrive at an opinion on the value "of the new features in CMN-700."³⁸ The fees found in the Nuvia TLA are not a sufficient basis for determining the value of the new features, including the At-Issue CMN Features. For example, Mr. Schottelkotte does not identify how he would [REDACTED] [REDACTED] In fact, Mr. Schoettelkotte's criticizes my approach stating that prices and license fees are subject to "many factors" in Arm's licensing model,⁴⁰ yet Mr. Schoettelkotte does not indicate what information in the record he would rely upon to identify and take into consideration to uncover the value of the new features in CMN-Kampos.

18. As I state in the Kennedy Counterclaim Report, information relevant to identifying the value of the CMN features including the At-Issue CMN Features includes [REDACTED]
[REDACTED]

³⁶ Schoettelkotte Rebuttal Report, p. 22.

³⁷ Schoettelkotte Rebuttal Report, p. 22.

³⁸ Schoettelkotte Rebuttal Report, p. 22.

³⁹ Kennedy Counterclaim Report, pp. 11-12, 16.

⁴⁰ Schoettelkotte Rebuttal Report, p. 23.

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██████████

██████████

██████████ In addition, in the Kennedy Counterclaim Report, I note that information from the price books for CMN products could assist in identifying value attributable to the At-Issue CMN Features, along with other new features that would have to be apportioned out.⁴³

19. Arm's list prices provide relevant information to identify what Arm charges for the value of the At-Issue CMN Features and other new features found in CMN-Kampos. Using list price information for CMN-Rhodes and CMN-Kampos to identify a list price premium for new features found in CMN-Kampos is instructive. In fact, Arm informed the Federal Trade Commission that ██████████

██████████ Specifically, ██████████

██████████

██████████ The list price premium is one data point that identifies the incremental value of the new features versus the existing features.⁴⁶ As I understand it, Arm's price books containing list prices for CMN-Rhodes and CMN-Kampos were not produced.

20. Further, Mr. Schoettelkotte opines that "my price premium approach is flawed" as there are several factors that could impact a change in price including compatibility with the latest Arm architecture and economic factors.⁴⁷ I disagree. For instance, the identification of value of

⁴¹ Kennedy Counterclaim Report, p. 25.

⁴² Kennedy Counterclaim Report, p. 26. See, for example, Arm Ltd.'s Responses and Objections to Qualcomm's Seventh Set of Requests for Production (Nos. 148-154), May 3, 2024, p. 6. Request for Production No. 149: "All Documents and Communications regarding ARM's determination of list prices, actual prices, license fees, royalty rates, royalty bases, or any other calculations associated with the royalties paid from or received by ARM relating to technologies similar to CMN..." and Request for Production No. 150: "All Documents, analyses, and reports demonstrating the list prices and actual prices associated with licensing features found in any version of CMN..."

⁴³ Kennedy Counterclaim Report, p. 26.

⁴⁴ ARM_01226630-706 at '645, '647-648.

⁴⁵ ARM_01226630-706 at '647-648.

⁴⁶ Kennedy Counterclaim Report, pp. 26-27.

⁴⁷ Schoettelkotte Rebuttal Report, pp. 22-23.

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new features found in CMN-Kampos relates to all new features, including the compatibility of the latest Arm architecture. Then, this value is subject to further apportionment, where a technical expert would quantify the technical importance of the At-Issue CMN Features relative to new features,⁴⁸ after identifying the full set of At-Issue CMN Features as opposed to the subset of features identified by Arm and Mr. Schoettelkotte.⁴⁹

21. Also, Mr. Schoettelkotte asserts that my purported inability to account for certain factors including the impact of “general inflation” “calls [my] methodology into question.” That assertion is entirely unfounded.⁵⁰ In support of this claim, Mr. Schottelkotte references Arm’s SEC filing, which discusses declining chip prices and a decrease in royalties as revenues fall.⁵¹ However, Mr. Schoettelkotte fails to provide any link between his “general inflation” observations about falling chip prices and the value of the new features including the At-Issue CMN Features in CMN-Kampos.

iv. Mr. Schoettelkotte provides irrelevant technical opinion criticisms

22. Mr. Schoettelkotte opines that I did not perform and present a technical apportionment, resulting in a flawed methodology.⁵² However, I am not a technical expert and I do not provide any technical apportionment opinions regarding the At-Issue CMN Features found in CMN-Kampos. As I described in the Kennedy Counterclaim Report, I understand that the Counterclaim-Plaintiffs requested specific information such as the identification of all features,

⁴⁸ Mr. Schoettelkotte opines that compatibility with the latest Arm architecture is a new feature.

⁴⁹ Also, with respect to technical importance, Mr. Schoettelkotte points out that “Dr. Kennedy does not explain why this step must solely rely information produced by Arm. In fact, Dr. Kennedy relies on a conversation with Ram Srinivasan...” (Schoettelkotte Rebuttal Report, p. 24) However, reliance on the Counterclaim-Plaintiffs’ information only would be incomplete as I understand the full scope of the At-Issue CMN Features is not known. Moreover, Arm would have information on all of the features including the At-Issue CMN Features and the compatibility with the latest Arm architecture, which would be relevant to a technical importance analysis.

⁵⁰ Schoettelkotte Rebuttal Report, p. 23.

⁵¹ Schoettelkotte Rebuttal Report, p. 23.

⁵² Schoettelkotte Rebuttal Report, p. 24.

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marketing-related materials, and customer surveys relating to the CMN products and features.⁵³ But I understand that Arm has not produced this information to date, even though Arm's personnel have communicated that information such as feature usage, for example, exists.⁵⁴ In the event relevant information is produced in this matter, an apportionment analysis could be conducted and I would apply this apportionment to my analysis.⁵⁵

23. Further, Mr. Schoettelkotte opines that I omit "the amount of time purportedly necessary for Arm" to independently develop the At-Issue CMN Features.⁵⁶ Mr. Schoettelkotte admits that in his experience, "the information related to the time to develop or redevelop the At-Issue CMN Features could be considered as part of a technical expert's report..."⁵⁷ I do not offer an opinion on the time period as this is a technical opinion, as Mr. Schoettelkotte points out. Furthermore, the amount of time required to independently develop the At-Issue CMN Features depends on the number and scope of the features. As stated in the Kennedy Counterclaim Report, I understand there is a deficiency in the production of relevant documents which limits the Counterclaim-Plaintiffs' ability to identify the full breadth of the At-Issue CMN Features,⁵⁸ which is necessary for identifying the time needed to independently develop the features.

v. Mr. Schoettelkotte provides what appear to be a legal opinion

24. Mr. Schoettelkotte opines that "identifying Arm licensees is irrelevant because that information is only relevant to the benefit Arm would have received and would not help measure the harm to Qualcomm or Nuvia."⁵⁹ This appears to be a legal opinion regarding available

⁵³ Kennedy Counterclaim Report, p. 27.

⁵⁴ Schoettelkotte Rebuttal Report, pp. 16-17.

⁵⁵ Kennedy Counterclaim Report, pp. 26-27.

⁵⁶ Schoettelkotte Rebuttal Report, p. 25.

⁵⁷ Schoettelkotte Rebuttal Report, pp. 25-26.

⁵⁸ Kennedy Counterclaim Report, pp. 23-24.

⁵⁹ Schoettelkotte Rebuttal Report, pp. 19-20.

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remedies and the Counterclaim-Plaintiffs' burden, which I cannot rebut as I am not a lawyer and do not provide legal opinions.

C. Conclusion

25. As described above, I disagree with Mr. Schoettelkotte's criticisms of the Kennedy Counterclaim Report and do not modify my methodology or opinions in any manner.

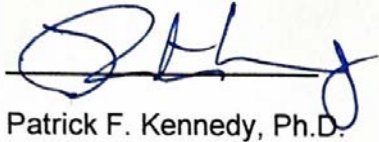
26. To reiterate my opinions in the Kennedy Counterclaim Report, I describe my methodology to quantify the license fees and royalties that Arm inappropriately received and would not have had if Arm had developed the Nuvia Confidential Information independently after the termination of the Nuvia ALA and Nuvia TLA.⁶⁰ I do not quantify this benefit because sufficient information had not been produced at the time and still has not been produced to date.⁶¹ I reserve the right to supplement my report upon the availability of the information needed to conduct a proper analysis.

⁶⁰ Kennedy Counterclaim Report, pp. 21-27.

⁶¹ Kennedy Counterclaim Report, p. 27.

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I declare under penalty of perjury that the foregoing is true and correct.



Patrick F. Kennedy, Ph.D.

Managing Director

Stout Risius Ross, LLC

6/24/24
Executed on

EXHIBIT A



Patrick F. Kennedy, PhD

Managing Director

Patrick F. Kennedy is a Managing Director at Stout based in San Diego, CA. Dr. Kennedy provides analysis, consultation, and expert opinions in business and dispute contexts. In his more than 25 years of experience, Dr. Kennedy has testified as an expert in Federal Court, the U.S. Court of Claims, Bankruptcy Court, State Court, and in private arbitrations throughout the country.

Dr. Kennedy has analyzed economic loss and damages in matters with causes of action including, but not limited to, patent, copyright, trademark and trade secret misappropriation, false advertising, breach of contract, product liability, fraud, professional malpractice, negligence, trespass, construction defect, antitrust and unfair competition, insurance bad faith, employment disputes and loss of earnings.

Dr. Kennedy has experience in a wide range of industries involving diverse technology.

PROFESSIONAL EXPERIENCE

2023 to present	Stout	Managing Director
2011 to 2023	Torrey Partners	Managing Director
2006 to 2011	LECG	Managing Director (2008)
1996 to 2006	Mack Barclay, Inc.	Shareholder (1998)
1995 to 1996	International Securities Group, Inc.	Director of Economic Research
1992 to 1995	Board of Governors of the Federal Reserve System, Washington, D.C.	Economist

EDUCATION

Doctorate in Economics, Stanford University, 1992

Awarded Stanford University Fellowship, Bradley Foundation Dissertation Fellowship, and Outstanding Teaching Award

Bachelor of Arts in Economics, University of California, San Diego, 1986

Muir College Valedictorian, Summa Cum Laude and Phi Beta Kappa. Awarded UC Regents Scholarship and the Seymour E. Harris Economics Award

LICENSES AND PROFESSIONAL MEMBERSHIPS

Registered Securities Representative and Registered Principal
(NASD Series 7, 24 and 63 – inactive)

American Economic Association

National Association for Business Economics

National Association for Forensic Economics

Licensing Executive Society

BOARD MEMBERSHIPS

Torrey Pines Bank, Board of Directors

University of California San Diego, Economic Leadership Board Member

SELECTED CASE AND INDUSTRY EXPERIENCE

INTELLECTUAL PROPERTY

- Patent infringement claims including cellular handset technologies, various integrated circuits, medical devices, action cameras, digital image sensors and processing, network and device security, software, social media, unmanned aerial vehicles, advertising, LED backlighting, vehicle equipment and testing, electronic lottery systems, antibacterial products, DNA-based diagnostic testing, radio frequency identification systems, apparel and other products
- Trade secret misappropriation claims including medical devices, responsive website design, drug development, network security, systems integration, merchant services, financial services, fiber-reinforced polymer systems, manufacturing, cellular handsets, Bluetooth devices and other products
- Trademark and copyright infringement claims including cloud storage, luxury watches, musical composition, a nationally branded convention, wireless headsets, food products, fashion accessories, field marketing organizations, ceiling fans, jewelry, toys, apparel, retail and other products

OTHER MATTERS

- Breach of contract, intentional interference with prospective economic advantage, professional malpractice, insurance bad faith and other claims in industries including, but not limited to, oil wells and extraction, pharmaceutical clinical trials, reference microorganisms and cell lines, aircraft rescue and firefighting vehicles, wineries, gaming and casinos, satellite television, water purification filters, defense contracting, aerospace, aircraft charter, medical services, government contracts, veterans counseling services, advertising, national franchises, printing, paper and plastics, multilevel marketing, agriculture, footwear, financial services, insurance brokerage and real estate development
- Qui Tam cases involving overbilling by major systems integrators, faulty illuminating flares used in military aviation, improper testing of semiconductors used in military applications, and faulty design of a spacecraft intended to return solar wind samples to earth
- Foodborne illness and product recall
- Natural disaster business losses, including the Northern and Southern California wildfires
- Eminent domain matters involving real estate development and construction aggregates
- Valuing liabilities associated with future product liability claims for an automobile manufacturer in bankruptcy court
- Valuing technology related to motor vehicle engine diagnostics, drone anti-collision sensor technology and other products and services
- Multidistrict product liability litigation including pharmaceutical products and asbestos
- Consumer and business class actions related to solar panels, a natural gas facility blowout, automotive products, assisted living facilities, mobile home park relocation and cellular services
- Antitrust damages in convention services, telecommunications, and aircraft
- Personal loss including aviation, maritime and under the Vaccine Injury Compensation Program

EXHIBIT B

Patrick F. Kennedy, Ph.D.
Deposition and Trial Testimony

Date	Case Name	Venue	Testimony
06/18/24	Risk v. United Airlines, Inc.	Los Angeles Superior Court	Deposition
04/17/24	Heredia, et al. v. Sunrise Senior Living, LLC	CA Central - Federal Court	Declaration
04/16/24	Pliner v. Central Iowa Health System, et al.	IA Federal Court	Deposition
04/12/24	Rex Computing, Inc. v. Cerebras Systems, Inc.	Delaware - Federal Court	Deposition
04/10/24	Saint Paul Commodities, Inc. v. Oleo-X LLC	NY American Arbitration Association	Arbitration
04/05/24	NantWorks, LLC v. Bank of America Corporation	CA Central - Federal Court	Deposition
03/01/24	Palm Beach Tan, Inc. v. Sunless, Inc.	OH Northern - Federal Court	Deposition
02/16/24	Cocke v. United States of America, et al.	GA Southern - Federal Court	Deposition
01/19/24	Saint Paul Commodities, Inc. v. Oleo-X LLC	NY American Arbitration Association	Deposition
12/14/23	Davis v. Secretary of Department of Health and Human Services	U.S. Court of Federal Claims	Hearing
11/15/23	Eilan v. Secretary of Department of Health and Human Services	U.S. Court of Federal Claims	Hearing
10/19/23	Stiner, et al. v. Brookdale Senior Living Communities, Inc.	CA Northern - Federal Court	Declaration
10/16/23	Jones v. Secretary of Department of Health and Human Services	U.S. Court of Federal Claims	Hearing
09/12/23	Pacific Steel Group v. Commerical Metals Company, et al.	CA Northern - Federal Court	Deposition
09/07/23	Bryan v. Secretary of Department of Health and Human Services	U.S. Court of Federal Claims	Hearing
09/05/23	Alorica, Inc. v. Fortinet, Inc.	Santa Clara Superior Court	Deposition
08/31/23	Alorica, Inc. v. Fortinet, Inc.	Santa Clara Superior Court	Deposition
08/22/23	Avila v. Joe Avis Farms	San Joaquin Superior Court	Trial
06/26/23	Bright v. Brookdale Senior Living Inc.; and Gunza v. Brookdale Senior Living Inc.	TN Middle - Federal Court	Deposition
06/01/23	Bright v. Brookdale Senior Living Inc.; and Gunza v. Brookdale Senior Living Inc.	TN Middle - Federal Court	Declaration
05/17/23	MicroVention, Inc. v. Balt USA, Inc.	CA Central - Federal Court	Deposition
04/26/23	Taction Technology, Inc. v. Apple Inc.	CA Southern - Federal Court	Deposition
04/21/23	Philips North America LLC, et al. v. TEC Holdings, Inc.	NC Western - Federal Court	Trial
04/14/23	Philips North America LLC, et al. v. TEC Holdings, Inc.	NC Western - Federal Court	Trial
04/13/23	PennyMac Loan Services, LLC v. Black Knight Servicing Technologies, LLC	American Arbitration Association	Arbitration
03/09/23	Raymond James Financial, Inc, et al. v. Deutsche Bank AG, et al.	FINRA Dispute Resolution	Arbitration
03/02/23	Wisk Aero LLC v. Archer Aviation, Inc.	CA Northern - Federal Court	Deposition
02/22/23	Raymond James Financial, Inc, et al. v. Deutsche Bank AG, et al.	FINRA Dispute Resolution	Deposition
02/14/23	Crysel v. American Equity	Orange County Superior Court	Trial
01/19/23	Dexcom v. Abbott	Delaware - Federal Court	Deposition
12/29/22	Crysel v. American Equity	Orange County Superior Court	Deposition
12/27/22	PennyMac Loan Services, LLC v. Black Knight Servicing Technologies, LLC	American Arbitration Association	Deposition
10/19/22	Avila v. Joe Avis Farms	San Joaquin Superior Court	Deposition
09/22/22	Alcon Vision, LLC v. Lens.com, Inc.	NY Eastern - Federal Court	Deposition
08/17/22	Vitalyte Sports Nutrition, Inc. v. Revitalyte, LLC	TX Western - Federal Court	Deposition
08/11/22	Sunstone Information Defense, Inc. v. International Business Machines Corporation	TX Western - Federal Court	Trial
08/04/22	Rodriguez, et al. v. Sea Breeze Jet Ski, LLC	CA Northern - Federal Court	Deposition
07/28/22	Kurin, Inc. v. Magnolia Medical Technologies, Inc.	Delaware - Federal Court	Trial
05/18/22	Stiner, et al. v. Brookdale Senior Living Communities, Inc.	CA Northern - Federal Court	Declaration
05/11/22	CRF Frozen Foods v. Pictsweet, et al.	TN Middle - Federal Court	Deposition
05/04/22	Ayers v. The Penta Building Group	Riverside Cty Superior Court	Trial
03/25/22	The Waffle v. Tucker Investments	Los Angeles Superior Court	Trial
02/17/22	Sunstone Information Defense, Inc. v. International Business Machines Corporation	TX Western - Federal Court	Deposition
01/27/22	Chan v. Kimball, Tirey & St. John	San Diego Superior Court	Deposition
01/17/22	MedImpact Healthcare Systems, Inc. v. IQVIA, Inc.	CA Southern - Federal Court	Deposition
01/14/22	Nelson v. United States of America, et al.	OR - Federal Court	Trial
01/05/22	DeLeon-Piedra v. Ocean Angel V	CA Northern - Federal Court	Deposition
12/14/21	Stiner, et al. v. Brookdale Senior Living Communities, Inc.	CA Northern - Federal Court	Deposition
12/01/21	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Deposition
11/18/21	Bellin Memorial Hospital v. Kinsey & Kinsey, Inc.	WI Federal Court	Trial
11/15/21	The Waffle v. Tucker Investments	Los Angeles Superior Court	Deposition
10/21/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	San Diego Superior Court	Deposition
10/18/21	Philips North America LLC, et al. v. Dorow	NC Federal Court	Deposition
10/18/21	Philips North America LLC, et al. v. Zimmerman, et al.	NC Federal Court	Deposition
10/12/21	MicroVention, Inc. v. Balt USA, Inc.	CA Central - Federal Court	Deposition
10/08/21	In re: PFA Insurance Marketing	CA Northern - Federal Court	Declaration
09/23/21	LISCR, LLC v. Legality Holdings, S.A.	VA Eastern - Federal Court	Deposition
09/17/21	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior Court	Trial
09/08/21	Philips North America LLC, et al. v. TEC Holdings, Inc.	GA Northern - Federal Court	Deposition
09/02/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	San Diego Superior Court	Deposition
08/26/21	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior Court	Trial
08/18/21	Stiner, et al. v. Brookdale Senior Living Communities, Inc.	CA Northern - Federal Court	Declaration
08/06/21	Kiva Health Brands, LLC v. Kiva Brands, Inc. et al.	CA Northern - Federal Court	Deposition
07/22/21	Fifth Avenue Landing v. RGC FAL, LLC	San Diego Superior Court	Trial

Patrick F. Kennedy, Ph.D.
Deposition and Trial Testimony

Date	Case Name	Venue	Testimony
07/16/21	In re: PFA Insurance Marketing	CA Northern - Federal Court	Deposition
07/15/21	Solid 21, Inc. v. Richemont North America, Inc., et al.	NY Southern - Federal Court	Deposition
07/09/21	Fifth Avenue Landing v. RGC FAL, LLC	San Diego Superior Court	Deposition
06/22/21	Gillespie v. CalTrans, et al.	Riverside Superior Court	Deposition
06/09/21	Gillespie v. CalTrans, et al.	Riverside Superior Court	Deposition
06/08/21	The Chicago Trust Company v. Lakeshore Recycling Systems, LLC	IL Federal Court	Deposition
06/03/21	7510 Hazard, LLC v. Connecticut General Life Insurance Company	San Diego Superior Court	Deposition
05/06/21	Micheli, et al. v. The City of Fresno	Fresno Superior Court	Declaration
04/23/21	Kurin Inc. v. Magnolia Medical Technologies	Delaware - Federal Court	Deposition
04/22/21	Perdue v. American Marine Corporation	Los Angeles Superior Court	Deposition
04/13/21	Newirth, et al. v. Aegis Senior Communities, LLC	CA Northern - Federal Court	Declaration
04/02/21	Philips North America LLC, et al. v. Summit Imaging Inc, et al.	WA Western - Federal Court	Deposition
03/25/21	Solid 21, Inc. v. Breitling USA Inc.	CT Federal Court	Deposition
03/09/21	Applied Medical Distribution Corporation v. Bruin Biometrics, LLC	Orange County Superior Court	Trial
01/20/21	Vertellus Holdings LLC, et al. v. W.R. Grace & Co-Conn	MD Federal Court	Deposition
01/15/21	Bellin Memorial Hospital v. Kinsey & Kinsey, Inc.	WI Federal Court	Deposition
11/04/20	Applied Medical Distribution Corporation v. Bruin Biometrics, LLC	Orange County Superior Court	Deposition
10/30/20	Underwater Kinetics v. Hanover Insurance	San Diego Superior Court	Deposition
10/29/20	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Deposition
07/14/20	Heredia, et al. v. Sunrise Senior Living, LLC	CA Central - Federal Court	Deposition
06/30/20	Contour IP Holdings v. GoPro	CA Northern - Federal Court	Deposition
06/23/20	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior Court	Deposition
05/18/20	Heredia, et al. v. Sunrise Senior Living, LLC	CA Central - Federal Court	Declaration
05/15/20	Shaw v. United States of America, et al.	CA Northern - Federal Court	Deposition
01/13/20	Vogel, et al. v. FCA US, LLC, et al.	San Diego Superior Court	Deposition
01/10/20	Bell Northern Research, LLC v. Coolpad Technologies, Inc.	CA Southern - Federal Court	Deposition
12/11/19	TRC Operating Company, Inc. v. Chevron U.S.A., Inc.	Kern Cty Superior	Deposition
11/21/19	Solid 21, Inc. v. Ulysse Nardin, Inc., et al.	FL Southern - Federal Court	Deposition
10/21/19	Newirth, et al. v. Aegis Senior Communities, LLC	CA Northern - Federal Court	Declaration
10/10/19	Micheli v. The City of Fresno	Fresno Superior Court	Deposition
10/09/19	Kurin Inc. v. Magnolia Medical Technologies	CA Southern - Federal Court	Deposition
09/24/19	Cordero v. Tadashi Shoji & Associates Inc.	Los Angeles Superior Court	Deposition
09/11/19	Taylor v. Norfolk Railway	IL State Court	Trial
09/03/19	Horne v. Leone, et al.	San Diego Superior Court	Deposition
08/27/19	Micheli, et al. v. The City of Fresno	Fresno Superior	Deposition
07/08/19	Reynolds v. Western Sugar Cooperative	NEB - Federal Court	Deposition
06/27/19	Credit Card Services, Inc. v. Chuang, et al.	Los Angeles Superior Court	Trial
06/24/19	Micheli, et al. v. The City of Fresno	Fresno Superior Court	Declaration
06/14/19	Ironhawk Technologies, Inc. v. Dropbox	CA Central - Federal Court	Deposition

EXHIBIT C

Qualcomm Inc., Qualcomm Technologies, Inc., and NuVia, Inc. v. Arm Ltd.
Documents Considered List

Exhibit C

Date	Description
<i>*In addition to the materials listed below, the materials I considered also include all cited sources in my expert report, my counterclaim report dated May 20, 2024 and my opening expert report dated February 27, 2024.</i>	
Legal	
03/13/24	Defendants' Answer and Defenses to Plaintiff's Complaint and Jury Demand and Defendants' Second Amended Counterclaims
03/29/24	Qualcomm's Sixth Set of Requests for Production (Nos. 125-147)
04/12/24	Arm Ltd.'s Objections and Responses to Qualcomm's Sixth Set of Requests for Production (Nos. 125-147)
04/29/24	Arm Ltd.'s Objections and Responses to Qualcomm's Fifth Set of Interrogatories
05/03/24	Arm Ltd.'s Responses and Objections to Qualcomm's Seventh Set of Requests for Production (Nos. 148-154)
05/07/24	Defendants' Responses and Objections to Plaintiff's Third Set of Interrogatories (Nos. 26-29)
05/10/24	Arm Ltd.'s Objections and Responses to Qualcomm's Sixth Set of Interrogatories (No. 29)
05/10/24	Arm Ltd.'s First Supplemental Objections and Responses to Qualcomm's Fifth Set of Interrogatories (Nos. 26-28)
Depositions	
12/07/23	Deposition of Mark Werkheiser and Exhibits Distinguished Engineer at Arm Ltd.
05/10/24	Rule 30(b)(6) Deposition of Guy Larri Distinguished Engineer at Arm Ltd.
Expert Reports	
02/27/24	Expert Report of Patrick F. Kennedy, Ph.D.
05/20/24	Expert Report of Patrick F. Kennedy, Ph.D.
05/20/24	Opening Expert Report of Dr. Murali Annavaram Regarding Qualcomm's Counterclaim
06/10/24	Reply Expert Report of W. Todd Schoettelkotte Relating to Remedies For Counterclaim-Plaintiffs' Claims
06/10/24	Rebuttal Expert Report of Dr. Robert P. Colwell to Dr. Annavaram's Opening Expert Report Regarding Qualcomm's Counterclaim
Produced Documents	
<i>*If the bates number referenced below is the beginning of a document/production, the bates reference is to the entire document.</i>	
<i>*I had access to a document repository containing documents produced by Arm, Qualcomm, and other 3rd parties.</i>	
	ARM_01226630
	ARM_01237494
	ARM_01460538

Exhibit 21

Message

From: Tim Herbert [Tim.Herbert@arm.com]
Sent: 15/07/2021 16:35:14
To: Lynn Couillard [Lynn.Couillard@arm.com]
Subject: Re: Follow up

Yes – I would enjoy being on that call...

From: Lynn Couillard <Lynn.Couillard@arm.com>
Date: Thursday, July 15, 2021 at 9:32 AM
To: Tim Herbert <Tim.Herbert@arm.com>
Subject: FW: Follow up

Tim – you weren't on the invite, shall I forward to you?

From: Galina Buelow Donovan <Galina.Donovan@arm.com>
Date: Thursday, July 15, 2021 at 9:22 AM
To: Will Abbey <Will.Abbey@arm.com>, Lynn Couillard <Lynn.Couillard@arm.com>
Cc: Tim Herbert <Tim.Herbert@arm.com>
Subject: RE: Follow up

No problem. I just sent the invite.

G

From: Will Abbey <Will.Abbey@arm.com>
Sent: Thursday, July 15, 2021 9:18 AM
To: Lynn Couillard <Lynn.Couillard@arm.com>; Galina Buelow Donovan <Galina.Donovan@arm.com>
Cc: Tim Herbert <Tim.Herbert@arm.com>
Subject: Re: Follow up

Galina,
4:30 PM today please.

From: Lynn Couillard <Lynn.Couillard@arm.com>
Date: Thursday, July 15, 2021 at 9:13 AM
To: Will Abbey <Will.Abbey@arm.com>
Cc: Tim Herbert <Tim.Herbert@arm.com>
Subject: Re: Follow up

Thanks Will, sorry for the cycles here, I was open in the morning other than the slot below, I omitted the afternoon schedule since you mentioned you'd call in the morning. I have a couple of items this afternoon, so to be specific for this afternoon I can do:

11a-12:30p
1p-2p
2:30p-3p
After 4p

I've also let Amanda know to see if she can book a time on our calendars.

Thank you!
Lynn

From: Will Abbey <Will.Abbey@arm.com>
Date: Thursday, July 15, 2021 at 9:05 AM
To: Lynn Couillard <Lynn.Couillard@arm.com>
Cc: Tim Herbert <Tim.Herbert@arm.com>
Subject: Re: Follow up

Noted. I'll call sometime in the afternoon.

From: Lynn Couillard <Lynn.Couillard@arm.com>
Date: Thursday, July 15, 2021 at 7:51 AM
To: Will Abbey <Will.Abbey@arm.com>
Cc: Tim Herbert <Tim.Herbert@arm.com>
Subject: Re: Follow up

Sounds good Will. Please note that I have a dental appointment at 10a-11am so will be unable to talk in that hour. Other than that slot I can be available whenever you are!

Thanks
Lynn

From: Will Abbey <Will.Abbey@arm.com>
Date: Wednesday, July 14, 2021 at 11:12 PM
To: Lynn Couillard <Lynn.Couillard@arm.com>
Cc: Tim Herbert <Tim.Herbert@arm.com>
Subject: Re: Follow up

Lynn,
I'll call you in the am to further discuss.

Thanks
Will

From: Lynn Couillard <Lynn.Couillard@arm.com>
Date: Wednesday, July 14, 2021 at 7:49 PM
To: Will Abbey <Will.Abbey@arm.com>
Cc: Tim Herbert <Tim.Herbert@arm.com>
Subject: Re: Follow up

Will



Lynn

From: Lynn Couillard <Lynn.Couillard@arm.com>
Sent: Wednesday, July 14, 2021 5:06:18 PM
To: Will Abbey <Will.Abbey@arm.com>
Cc: Tim Herbert <Tim.Herbert@arm.com>
Subject: Re: Follow up

Hi Will



Redaction - Privileged



Let me know if you need anything or would prefer a call to sync.

Lynn

From: Will Abbey <Will.Abbey@arm.com>
Sent: Wednesday, July 14, 2021 4:09:19 PM
To: Lynn Couillard <Lynn.Couillard@arm.com>
Cc: Tim Herbert <Tim.Herbert@arm.com>
Subject: FW: Follow up

FYI...



Thanks
Will

From: Simon Segars <Simon.Segars@arm.com>
Date: Wednesday, July 14, 2021 at 12:46 PM
To: Rene Haas <Rene.Haas@arm.com>, Will Abbey <Will.Abbey@arm.com>, Paul Williamson

<Paul.Williamson@arm.com>

Subject: FW: Follow up

SS.

From: Cristiano Amon <camon@qualcomm.com>

Sent: Wednesday, July 14, 2021 10:18 AM

To: Simon Segars <Simon.Segars@arm.com>

Cc: Cristiano Amon <camon@qualcomm.com>

Subject: RE: Follow up

Hi Simon

Thanks and regards,

Cristiano.

CONFIDENTIAL SETTLEMENT COMMUNICATION: FRE 408

From: Simon Segars <Simon.Segars@arm.com>
Sent: Tuesday, June 29, 2021, 4:52 PM
To: Cristiano Amon
Subject: [EXT] Follow up

Hi Cristiano,



Thanks and regards,

Simon.

IMPORTANT NOTICE: The contents of this email and any attachments are confidential and may also be privileged. If you are not the intended recipient, please notify the sender immediately and do not disclose the contents to any other person, use it for any purpose, or store or copy the information in any medium. Thank you.